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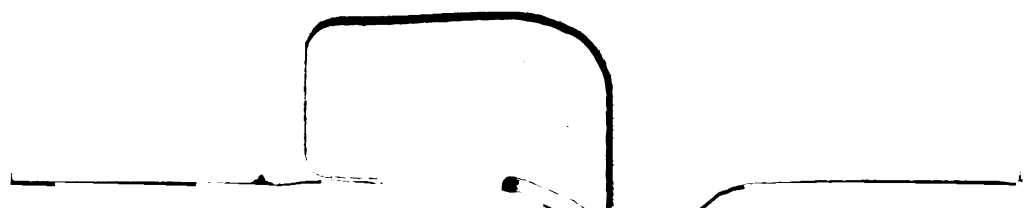
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**DISEASES OF THE GALL-BLADDER
AND BILE-DUCTS.**

D I S E A S E S
OF
THE GALL-BLADDER AND
BILE-DUCTS,
INCLUDING GALL-STONES.

BY

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PREFACE TO SECOND EDITION.

ALTHOUGH the first issue of my lectures on 'Diseases of the Gall-bladder and Bile-ducts' was taken up within a few weeks, want of leisure prevented me from preparing a second edition, more especially since it involved a recasting of the whole book, and changing it from the lecture to the narrative form.

Had it not been for the kind help of my friend Dr. Macrae, who has also assisted me in my operative work during the past two years, the issue of the work must have been further delayed.

It will be found that, besides new chapters on Membranous Cholecystitis and on Gall-stones, and an index, many additions have been made to the text, and that my further operative experience, amounting to 135 cases, making in all 305 operations, has been included.

Instead of arranging the cases all together at the end of the volume, they have been classified, and placed at the end of the sections referring to the operations under consideration (the numbers preceding the cases having reference to the order of operation), which has seemed to me and my co-editor a more convenient method than the one pursued in the first edition.

An analysis of the operations will show that far more serious cases have been operated on in the later series. This

is especially shown in the operation for gall-stones impacted in the common duct, as well as in the cholecystotomies. In the latter list, it will be found that the mortality in cholecystotomy for gall-stones uncomplicated with deep jaundice, infective cholangitis, or cancer, is 1·1 per cent., while even including the malignant cases it is only 4·76 per cent.

I would take this opportunity of thanking my House Surgeon, Mr. J. Williamson, for the two additional drawings on pp. 147 and 148.

A. W. M. R.

7, PARK SQUARE, LEEDS,
February, 1900.

PREFACE TO FIRST EDITION.

THE present volume is a reproduction of the lectures which, as Hunterian Professor, I had the honour of delivering at the Royal College of Surgeons of England in 1897. The views enunciated are the result of many years of observation on a class of cases to which until lately too little attention had been paid.

Thanks to my medical colleagues on the staff of the General Infirmary at Leeds, and to my many medical friends, I have had the opportunity of seeing a very considerable number of cases of the diseases in question, and of operating on those where surgical interference was required. Perhaps not the least useful part of the work is the synopsis of a consecutive series of operations performed on the gall-bladder and bile-ducts, which, for convenience of reference, I have had placed in a tabulated form at the end of the volume.

I am fortunately able to state that I have never lost a single patient after any operation for gall-stones in the absence of malignant disease, deep jaundice, or infective cholangitis, and it will be found, on reference to the list, that cholecystotomy for gall-stones, even including the infective cholangitis and deeply-jaundiced cases, only shows a mortality of 1·7 per cent.

I feel, therefore, in advancing the proposition 'that as soon as gall-stones give serious trouble their removal by operation is the most rational method of treatment,' it is one that can be safely supported, since it is only from the

complications, which in many cases of cholelithiasis arise sooner or later, that any danger after operation need be apprehended.

I must not fail to thank most sincerely the pathological curators of the Hunterian and of the various London Medical School Museums, for their unfailing courtesy and kindness in giving me every facility for the study of the valuable specimens under their care, and the pathological committees of the various schools for their kindness in allowing me to show the original specimens at the college on the occasion of my lectures, and to have them photographed to illustrate the present volume.

My thanks are due to my friend and late assistant, Dr. H. Colligan Donald, for making a synopsis of and arranging my cases; to Dr. F. Gairdner and Dr. Morton, for their assistance with the diagrams; to Mr. Godart, for the excellent photographs of the specimens; and last, though not least, to my most obliging publisher, Mr. A. A. Tindall, for his courtesy and help in illustrating and in publishing the work.

A. W. M. R.

7, PARK SQUARE, LEEDS,
June, 1897.

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DISEASES OF THE GALL-BLADDER AND BILE-DUCTS.

CHAPTER I.

ANATOMICAL CONSIDERATIONS.

THE gall-bladder is a pear-shaped sac which lies against the under surface of the right lobe of the liver, filling up a fossa immediately to the right of the quadrate lobe, and projecting into the peritoneal cavity. It varies greatly in size, but measures, as a rule, from 3 to 4 inches in length, and at its broadest part, close up to the fundus, its diameter is rather less than half its usual length.

The fundus, when the gall-bladder is normally distended, projects slightly beyond the free margin of the liver, immediately behind the cartilage of the ninth or tenth rib; but, as the under surface of the cyst looks backward and downward, it cannot in its normal condition be made out by palpation of the abdomen. From this position the cyst passes backward and slightly to the left, gradually narrowing until its neck ends in a sigmoid curve, the terminal portion of which turns downward to its junction with the cystic duct near the right extremity of the transverse fissure of the liver. Its upper surface, as a rule, is attached to the under surface of the liver by connective tissue, the peritoneum covering the fundus and lower surface, and passing thence to the liver; but occasionally (5 per cent., Dr. Brewer, 'Annals of Surgery,' June, 1899) it is completely invested by peri-

toneum, there being on the upper side a distinct mesentery which allows more or less free movement. In 3 cases out of 100 examined by Dr. Brewer, a mesentery was formed on the lower surface by an extension outward of the free border of the lesser omentum to the fundus, a condition also described by the late Mr. Greig Smith. The cystic duct passes backward, slightly downward, and to the left for about $1\frac{1}{2}$ inches (average given by Dr. Brewer for 100 cases, $1\frac{1}{8}$ inches), where it joins the hepatic duct at an acute angle to form the common bile-duct. The hepatic duct measures about 2 inches in length, and is formed by the junction at a very obtuse angle of a branch from the right and another from the left lobe of the liver which issue at the transverse fissure. Thence it descends somewhat to the right within the gastro-hepatic omentum lying in front of the portal vein, and having the hepatic artery to its left, in its lower part very close to the duct, but diverging slightly as the liver is approached. The common duct averages 3 inches in length, and passes backward and downward between the layers of the gastro-hepatic omentum, having the same relation to portal vein and hepatic artery as the hepatic duct. Passing behind the first part of the duodenum, it continues downward on the inner and posterior surface of the second part in intimate relation with the head of the pancreas, and for a short distance in contact with the right side of the duct of Wirsung. Along with the duct from the pancreas, it perforates the muscular coat of the duodenum, and they then run together for about $\frac{3}{4}$ inch in the submucous tissue, causing an elevation of the mucous membrane, and open into the lumen of the bowel by a common orifice just over 3 inches from the pyloric extremity of the stomach.

The cystic duct normally admits a No. 5 catheter, while the common duct permits passage of a No. 7 catheter; but at different parts they both vary in size, the cystic duct being narrowest at its junction with the hepatic duct, while the common duct shows two dilatations, one just at its beginning, and another near its termination. At its entrance into the duodenum it is so narrow that it only admits a fine probe. The ducts have each three coats—serous, muscular, and

mucous—the only one which for our present purpose is of much interest being the innermost. This in the cystic duct is usually described as being arranged in a spiral form, though this is not always well marked; but it is certainly thrown into folds which, especially at its orifice, act as a valve, and tend to obstruct the free passage of a probe. Indeed, Dr. Brewer, in the paper already alluded to, says he feels ‘justified in stating that a degree of patency of the cystic duct, sufficient to allow the easy passage of a probe, is in all probability a pathological condition’; but this assumption is probably more than the facts warrant.

The gall-bladder gets a free supply of blood from a branch of the right division of the hepatic artery—the cystic artery—which in turn sends a branch along the cystic duct to anastomose with a branch from the gastro-duodenal artery. The cystic veins empty themselves into the portal vein.

Accompanying the arteries are branches from the *coeliac* plexus of the sympathetic.

The lower surface of the gall-bladder is in relation with the hepatic flexure of the colon, and, towards its neck, with the first part of the duodenum, and occasionally the pylorus. The tip of the fundus just touches the anterior abdominal wall, and occasionally the right border of the great omentum lies in contact with it. In pathological conditions great alterations are found in the anatomy of the parts.

The mucous membrane of the gall-bladder is richly studded with glands which secrete mucus. Blockage of the cystic duct, while it probably, to a certain extent, interferes with this function, does not entirely do away with it. In cases of mechanical obstruction, it is common to have the gall-bladder distended to a varying extent with clear, translucent, glairy fluid. The usual capacity of the cyst is said to be about 6 drachms; but it is not infrequently distended so as to hold over a pint of fluid, while several cases are on record of tumours due to dilated gall-bladders reaching such dimensions as to have been operated on by surgeons under the impression that they were ordinary ovarian tumours. When moderately distended, it is usually to be felt in the direction of a line drawn from the ninth or tenth costal cartilage, and

passing somewhat to the right of the umbilicus; but this position may be altered, from unusual size of the left lobe, or other structural variation of the liver, so that it may even project into the right lumbar region. On the other hand, especially where there have been repeated attacks of gall-stone colic extending over a long period, it is more usual to find the gall-bladder smaller than normal, and occupying a position just in front of the transverse fissure of the liver. So far may this contraction go, that there may be almost complete obliteration of the sac, though this latter condition is not frequent. In these cases, also, there is not infrequently increased difficulty in recognising the true relation of the parts, from the adhesions of some of the surrounding organs by more or less intimate bonds to the gall-bladder and liver, so as completely to hide the gall-bladder from view when the peritoneal cavity is opened.

With cirrhosis of the liver, the gall-bladder is of course carried up well under the ribs, while, if the liver is enlarged from any cause, or displaced downwards by emphysema of the lungs, the gall-bladder will be pushed to a lower level.

Similarly, in diseased conditions, considerable variations occur in the size and relations of the ducts. It is not at all unusual for the common duct to be sufficiently dilated to permit a gall-stone $\frac{1}{2}$ inch in diameter to 'float' in it, and stones quite as large as that have been at times extracted from the cystic duct. More rarely the hepatic duct also is enlarged sufficiently to admit the little finger. In a few cases there has been noted congenital absence of the gall-bladder, and in these the hepatic duct and its subdivisions in the liver have been found dilated.

Congenital Malformations.—There is apparently no part of the biliary apparatus, except the liver, which may not be absent; while this is not to be wondered at in the case of the gall-bladder and cystic duct (as in specimen No. 1,390 in Guy's Museum, in one specimen in St. Thomas's, and in two at Middlesex), since they are normally wanting in certain animals, and are frequently obliterated by disease in the human subject; it affords serious food for thought, to find that life has been possible for six months, where even the

hepatic and common ducts are represented by mere fibrous cords, as in specimen No. 973 in St. Mary's, and No. 1,017 in King's College Museums.

Though but little attention has been paid to the matter, hour-glass-shaped gall-bladder is probably not uncommon. Occasionally one has to operate on cases in which the distal part of the gall-bladder contains calculi, and communicates by a narrow neck with the cyst proper. In some instances

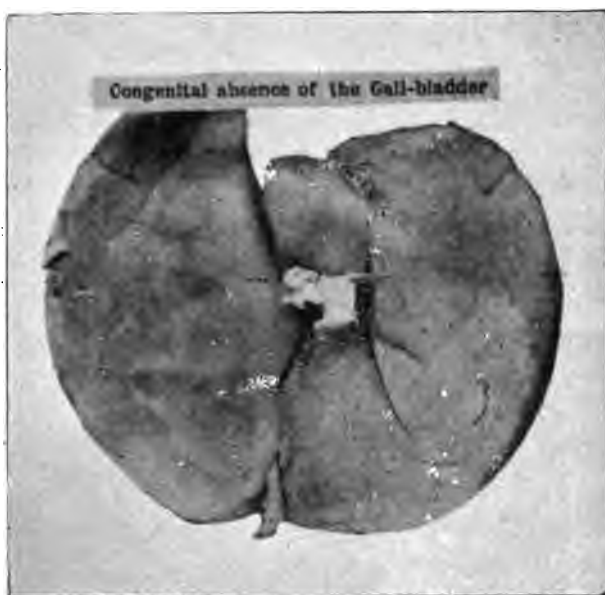


FIG. 1.

(No. 1,390, Guy's Museum.)

no doubt, this condition arises from contraction of an old ulcer, but in others, as in Case 55, the mucous membrane being smooth and showing no evidence of cicatrization, the deformity appears to be congenital. Dr. Pilcher has described a case belonging to the latter category, and another has recently been published by Dr. H. C. Donald, of Paisley, in which the gall-bladder was found to be 'thickened and contracted, being firmly adherent to, and tucked up to, the under surface of the liver. It was distinctly hour-glass in

character, and contained a thick, clear, and glairy mucus. Two calculi were removed from the proximal part of the gall-bladder, which was separated from the distal by a narrow



FIG. 2.--CONGENITAL ABSENCE OF COMMON, CYSTIC AND HEPATIC DUCTS.
(No. 973, St. Mary's Museum.)

neck, the calibre of which would admit a long probe such as is used in exploring the ducts.' He adds: 'I cannot advance an opinion as to whether this condition of gall-bladder was congenital or due to ulceration.'

A curious malformation is seen in specimen No. 1,391 in Guy's Museum, in which the gall-bladder is dilated and turned to the left, forming an ovoid tumour 3 inches long,



FIG. 3.—OBLITERATION OF GALL-BLADDER AND COMMON DUCT, THE RESULT OF GALL-STONE IRRITATION.

(No. 1,391, College of Surgeons Museum.)

parallel with and projecting beyond the anterior edge of the liver.

Rarely the gall-bladder is partly divided longitudinally, and it is said that occasionally there are hepato-cystic ducts, and that the right and left divisions of the hepatic duct

continue separate for some distance within the gastro-hepatic omentum.

The accompanying drawing is taken from a specimen of a bifid gall-bladder of a sheep presented by Dr. Beatson of Glasgow.

In the *Annals of Surgery* for May, 1899, is related a case in which there was transposition of viscera, and as the patient was the subject of gall-stones, cholecystotomy was successfully performed on the left side.

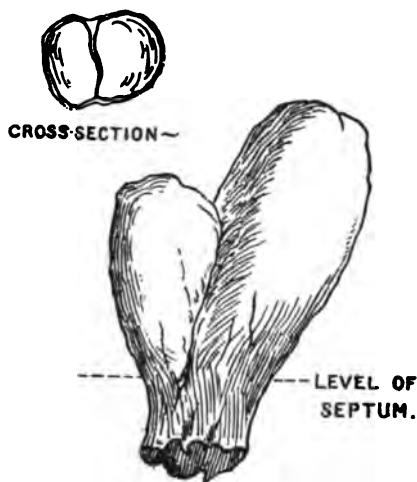


FIG. 4.—BIFID GALL-BLADDER FROM A SHEEP.
(Leeds Museum.)

The common bile-duct has recently received much attention at the hands of several observers, and the papers by M. le Dr. Quenu in the *Revue de Chirurgie* for 1895, and by Dr. Fenger in the *American Journal of Medical Science* for February and March, 1896, are both of great practical utility. The former gives a number of exact measurements, and describes a small vessel, a branch of the pancreaticoduodenal artery, as also some branches of the portal vein and hepatic artery crossing over the duct, which might be seriously in the way in the operation of choledochotomy. Dr. Fenger also shows how the portal vein, gradually winding round the common duct, comes to be placed on the

outer side of the upper third, even overlapping the front of it and the termination of the cystic duct, thus apparently demonstrating that the middle portion of the ductus com-

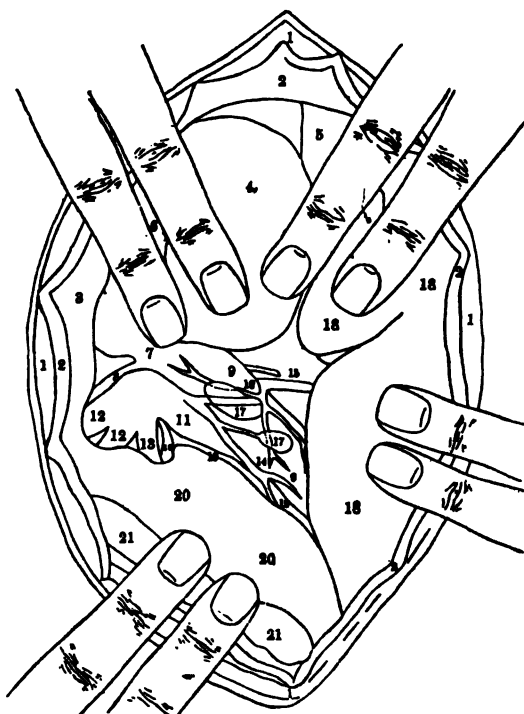


FIG. 5.—FIELD OF OPERATION. DIAGRAM TO SHOW RELATIONS OF COMMON BILE-DUCT. (AFTER FENGER.)

- 1, Wound through abdominal wall; 2, parietal peritoneum sutured to skin;
- 3, right lobe of liver, lower surface; 4, quadrate lobe of liver; 5, suspensory ligament of liver; 6, gall-bladder; 7, cystic duct; 8, hepatic duct; 9, common duct; 10, branch of hepatic duct to lobus Spigelii; 11, trunk of vena porta;
- 12, branches of vena porta to right lobe; 13, branches of vena porta to lobus Spigelii; 14, small branch of vena porta in hepatico-duodenal ligament;
- 15, hepatic artery; 16, branches of hepatic artery to hepatico-duodenal ligament; 17, lymph-glands in hepatico-duodenal ligament; 18, duodenum;
- 19, entrance to foramen of Winslow; 20, hepatico-colic ligament; 21, transverse colon.

munis, and the upper two-thirds of the cystic duct, are the only convenient situations for choledochotomy. Perhaps the diagram will enable one to appreciate these points more clearly.

In palpating the common duct for gall-stones, the surgeon frequently feels several more or less hard nodules within the



FIG. 6.—MELANOTIC TUMOUR OF GALL-BLADDER AND GLANDS IN PORTAL FISSURE.
(No. 2,809, Hunterian Museum, Royal College of Surgeons.)

free border of the lesser omentum, by the side, or in front of, the common duct, and unless it be borne in mind that three or four lymphatic glands normally exist here, they may be

apt to mislead, especially as they are not unusually considerably enlarged where there is gall-stone irritation. Frequently they are as large as beans, and at times the size of filberts. No. 2,809 Hunterian Museum shows these glands much enlarged and melanotic (Fig. 6).

The large peritoneal pouch (Fig. 7) shown in the diagram—bounded above by the right lobe of the liver, below by the ascending layer of the transverse meso-colon covering the duodenum internally, externally by the peritoneum lining

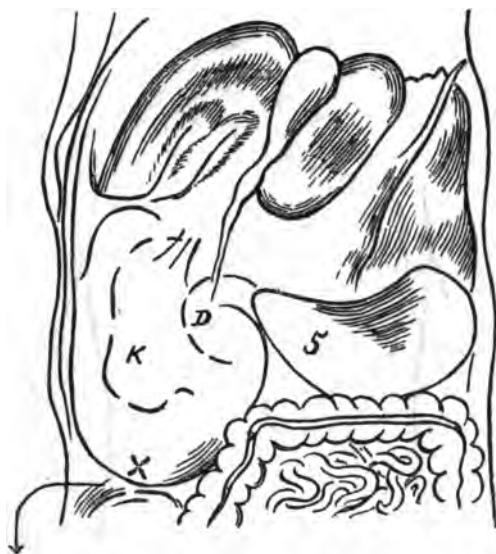


FIG. 7.—PERITONEAL POUCH ON RIGHT SIDE OF ABDOMEN.

X, Deepest part of the pouch; 5, stomach.

the parietes down to the crest of the ilium, posteriorly by the ascending meso-colon covering the kidney, and internally by the peritoneum covering the spine—has been long recognised, but perhaps not sufficiently appreciated in gall-bladder surgery.

Mr. Rutherford Morison drew attention to it in a paper in the *British Medical Journal* for March 3, 1894.

It is possible to drain this pouch satisfactorily by means of a long glass tube, but it is probably safer on the whole to make use of a lumbar drain. The author referred to places

such reliance on the ease and safety with which it can be drained that he does not advocate much time being spent in suturing incisions in the gall-bladder or bile-ducts. It is interesting to note that it is capable of holding nearly a pint of fluid before it overflows into the general peritoneal cavity, through the foramen of Winslow or over the pelvic brim.

A deformity of the liver, congenital or acquired, may at times lead to a difficulty in diagnosis or in treatment. The common form is a tongue-shaped prolongation of the right

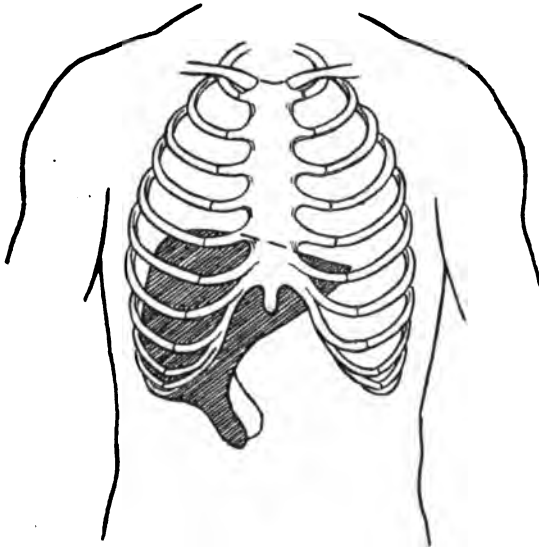


FIG. 8.—LINGUIFORM PROCESS OF LIVER.

lobe, which may project below the costal margin for several inches and simulate a tumour of the liver or an enlarged gall-bladder.

One form of the enlargement shown in Cruveilhier's Atlas is supposed to have been due to tight-lacing; it was associated with dropsy of the gall-bladder and gall-stones.

In some instances the gall-bladder projects beyond the apex of the linguiform projection, as in a case described by Dr. Hellier* (Fig. 8).

In Case 234 the gall-bladder and linguiform process of the liver reached the cæcal region, and the recurrent attacks of

* *British Medical Journal*, May 4, 1895.

pain associated with local peritonitis and unaccompanied by jaundice much resembled recurring appendicitis, the point of greatest tenderness being situated midway between the umbilicus and anterior superior spine of the ilium, in which position the incision for the operation was made.

In others the projection is external to the gall-bladder, which is then found lying on its inner side (Fig. 9).

In a case of this kind, where the gall-bladder is contracted, and calculi are impacted in the cystic duct, there may be the greatest difficulty in extracting them, owing to the limitation of the space for manipulation caused by the abnormality.

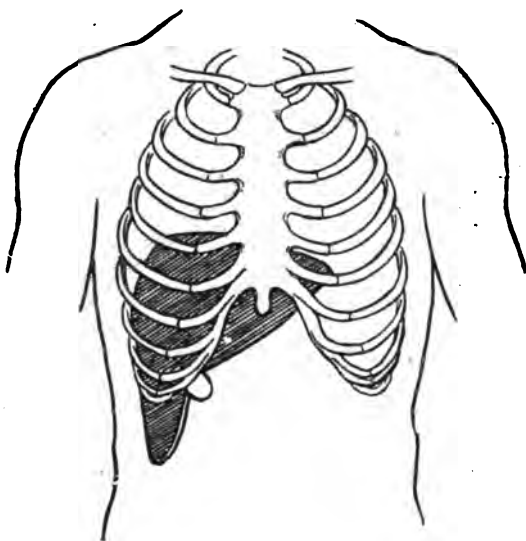


FIG. 9.—LINGUIFORM PROCESS OF LIVER.

Professor Riedel has described it, and the projection is sometimes known as Riedel's lobe. It is said to be uniformly due to cholelithiasis, but that it is not always associated with gall-stones our experience in several cases demonstrates.

The liver is sometimes displaced vertically, as in Case 268, where the incision had to be prolonged quite up to the ensiform cartilage in order to reach the shrunken gall-bladder, lying under cover of the liver, the 'under' surface of which faced to the left side. In this case the left lobe was much smaller than the right, which formed the great bulk of the liver.

CHAPTER II.

INFLAMMATORY AFFECTIONS.

INFLAMMATORY affections may be conveniently considered clinically under the following headings :

1. Catarrhal Inflammation.

- (a) Acute catarrhal cholangitis.
- (b) Chronic catarrhal cholangitis.
- (c) Chronic catarrhal cholecystitis.

2. Croupous Inflammation of the Gall-bladder and Bile-ducts.

3. Suppurative Inflammation.

- (a) Simple suppurative cholecystitis, or suppurative catarrh or simple empyema of the gall-bladder.
- (b) Suppurative and infective cholangitis.
- (c) Acute parenchymatous or phlegmonous cholecystitis and gangrene of the gall-bladder.
- (d) Ulceration of the gall-bladder and bile-ducts.
- (e) Pericholecystitis and adhesions.
- (f) Stricture of the gall-bladder and bile-ducts.
- (g) Perforation of the gall-bladder and bile-ducts.
- (h) Fistula of the gall-bladder and bile-ducts.

CATARRH OF THE GALL-BLADDER AND BILE-DUCTS.

The larger bile-ducts and the gall-bladder, being lined with mucous membrane having cylindrical epithelium and ordinary racemose glands, are, like other mucous passages, subject to catarrh, which may be acute or chronic.

As acute and chronic catarrhal jaundice are subjects of medical rather than surgical interest, they will only be briefly considered here; but it must not be forgotten that chronic catarrhal cholangitis, by simulating jaundice due to organic mischief, or from its frequent association with serious disease, such as cholelithiasis, cancer, or hydatids, has some important surgical bearings, and that, when medical means have failed, surgical treatment may be worth seriously considering.

It should also be borne in mind that the jaundice accompanying cancer of the liver is frequently catarrhal, and therefore capable of being relieved by treatment, although the original disease persists. Also that the evanescent jaundice following on cholelithic attacks is often catarrhal, and not due to the mechanical obstruction of a gall-stone.

(a) **Acute catarrh** is supposed to give rise to the evanescent form of icterus, known as *catarrhal jaundice*, which, more frequently occurring in young persons, usually comes on as a sequence of dyspepsia or as a result of exposure to cold, and is ordinarily unaccompanied by pain or serious illness, but for which help is sought on account of the marked objective symptom of jaundice.

When it is borne in mind that the bile-ducts have only a limited calibre, that the mucous lining is capable of swelling so as to occlude the passage, and that the secretion of bile takes place under very low blood-tension (according to Naunyn, 110 to 220 mm. of water), and is therefore arrested by slight backward pressure, it is easy to comprehend how catarrh in this situation should lead to jaundice, though absolute proof of the correctness of the theory is wanting, since simple catarrhal jaundice furnishes no *post-mortem* subjects.

Etiology.—An extension from the duodenum is probably the usual cause of acute catarrhal jaundice, and as the common bile-duct traverses the walls of the duodenum very obliquely, it is to be expected that the narrow terminal portion of the duct will be the first to suffer, and be the seat of the primary obstruction.

Beside gastro-intestinal catarrh, exposure to cold, exten-

sion to the bile-ducts of inflammation from the parenchyma of the liver, carcinoma of the liver, gall-stones, hydatids, pneumonia, and other acute inflammations and infectious fevers, must be mentioned as causes of catarrh, direct or indirect. Murchison gives gout and syphilis as causes, and the late Dr. Fagge includes under this heading jaundice due to fright and that occurring in epidemics.

Although it is well known that in cancer of the liver jaundice is a very variable sign, it is not always recognised that the icterus is at times dependent on the associated catarrh, which may be relieved by treatment, though the original disease persists.

As the symptoms, diagnosis, and treatment of catarrhal jaundice are so distinctly subjects of medical rather than surgical interest, one may at once pass on to consider the chronic form, which from a diagnostic point of view has important surgical bearings.

(b) **Chronic cholangitis**, or chronic catarrh of the bile-ducts, may be simply a sequel to the acute form, and may then give rise to a more or less persistent jaundice leading to a suspicion of serious organic disease.

Although there are dyspeptic symptoms due to the associated gastro-intestinal catarrh, with jaundice and some loss of weight, the retention of strength and the absence of serious sequelæ, such as ascites and hæmorrhage, generally enable a good prognosis to be given, especially as the symptoms usually yield to proper treatment.

Catarrh of the bile-ducts probably always accompanies jaundice from whatever cause, and, as Dr. Moxon has pointed out, a colourless mucus is always found in the bile-ducts when an obstruction in the common duct is complete. A search through the pathological records of Guy's Hospital for twenty years failed to discover any exception to this rule. When the obstruction is only partial, the mucus may be well charged with bile, as the backward pressure is not sufficient to stop the secretion and pouring out of bile into the ducts.

Specimen 1,420 in Guy's Museum shows dilated bile-ducts in the liver holding a pint of clear mucus (Fig. 10). There

was a small cancerous growth in the common duct. Case 35 is a good example of a similar condition, but in it the obstruction was due to gall-stones.

As a concomitant of cancer of the liver or of the bile-ducts, chronic catarrh is common, and is frequently the cause of the accompanying icterus. This accounts for the relief to



FIG. 10.—CHRONIC CATARRH WITH DILATATION OF BILE-DUCTS IN LIVER, DEPENDENT ON SMALL CANCEROUS GROWTH IN COMMON DUCT.

(No. 1,420, Guy's Museum.)

the jaundice afforded by treatment in a necessarily fatal disease; whereas, when the jaundice is simply dependent on the mechanical pressure of the growth in the ducts, it will be only slightly, or not at all, influenced by remedies.

The same remarks apply to hydatid disease, to abscess, and to other organic diseases of the liver.

Cases 152, 157, and 161 are good examples of chronic catarrhal jaundice produced by the irritation of hydatid cysts in the liver, the catarrh and its accompaniment (jaundice) being cured by the removal of the cause.

Gall-stones are probably always accompanied by catarrh, giving rise to the formation of thick ropy mucus, which leads to attacks of pain when passing, and it seems not unlikely that some of the minor seizures of pain not followed by jaundice, or, if so, only to a slight extent, and where no gall-stones are subsequently found in the evacuations, are of this nature.

Although the jaundice in cholelithiasis is usually produced by a gall-stone obstructing the common or hepatic duct, it is undoubtedly true that in many cases jaundice is present when the concretion is in the gall-bladder or in the cystic duct, the obstruction to the flow of bile being caused by an inflammatory swelling of the mucous membrane of the bile channels caused by extension from the seat of obstruction; in other words, the jaundice is dependent on catarrhal inflammation. This occurs also in many cases where, after cholecystotomy has been performed and gall-stones have been removed from the gall-bladder and cystic duct, and the common duct has been shown to be free of all concretions, for several days all the bile flows through the tube introduced into the gall-bladder, that is, till the inflammatory swelling of the mucous membrane of the common duct has had time to subside.

Riedel* states that about two-fifths of the cases of jaundice in cholelithiasis arise in this way. He quotes one case where the gall-stone was outside the bile channel in a perforative abscess cavity, and in a case† seen with Dr. Chadwick at the Leeds Infirmary this was so.

The treatment of chronic catarrhal jaundice is at first medical, and if the disease prove obstinate, a course at Harrogate or Carlsbad will be likely to do good if the ailment be functional; but that failing, the question of some organic

* Ref. Gumprecht, *Deutsch. Med. Woch.*, 1895, No. 15.

† *British Medical Journal*, May 25, 1895.

cause that may be removable by surgical treatment should be considered.

Dr. Thudichum, who published a treatise on gall-stones in 1863, describes a catarrh of the finest ramifications of the bile-ducts which causes their lining to be shed in the shape of biliary casts. He considers that these often form the nucleus of gall-stones, where the catarrh is associated with decomposition of bile due to bacteria invading the obstructed bile-ducts.

This has been termed by Meckel 'lithiatic catarrh'; perhaps a better term is desquamating angio-cholitis, or stone-forming catarrh of the bile-ducts.

It doubtless has great etiological importance in reference to gall-stones, especially when associated with decomposition due to the presence of micro-organisms in the stagnant fluid in the ducts.

(c) **Catarrhal cholecystitis**, or chronic catarrh of the gall-bladder without jaundice, forms a distinct and definite disease, and we have seen several cases in which cholelithiasis had been diagnosed and operation advised, but where neither the gall-bladder nor ducts contained anything firmer than thick ropy mucus, which was apparently the cause of painful contractions of the gall-bladder simulating gall-stone seizures.

In one case of this kind, in a lady of sixty, the gall-bladder contained bile mixed with thick ropy mucus, which formed plugs almost like small grains of boiled sago; there were no other signs of disease, but the gall-bladder was very large and pouched, and the mucous membrane thickened. Cholecystotomy was performed, and the drainage was continued for a fortnight, after which the wound was allowed to close. The patient, after two years, continues well, and is freed from her previously frequently-recurring attacks. (Case 101.)

Specimen No. 1,416 in Guy's Museum may be a case of this kind; it shows a gall-bladder distended with mucus although there was no organic obstruction in the ducts. It was removed from a patient of Mr. Cock's who died from pyæmia following on acute necrosis.

In yet another case, in a lady of thirty-two, the history of gall-stones was most characteristic, and, from the adhesions found at the time of operation, there can be no doubt that at some time they had been present. At the time of operation, the gall-bladder and ducts were free from concretions, though, on opening the gall-bladder, thick ropy mucus like that mentioned as having been present in Case 101 was found.

Cholecystotomy and drainage for a week brought about relief, and although there was some repetition of the attacks, doubtless from the drainage not having been continued sufficiently long, persistence with appropriate medical treatment for a time effected a cure, and the patient is now quite well. (Case 97.)

Case 165 is one of the most marked examples, and as it occurred in a lady medically trained, who made her own diagnosis in the first instance, it has especial value, since it shows that the attacks due to catarrhal cholecystitis were equally severe with those undoubtedly due to gall-stones. In the early attacks gall-stones were passed, and discovered in the motions; the attacks persisting, operation was done, and catarrhal cholecystitis only discovered.

In another instance, in a lady of fifty-five, seen in consultation with Dr. Parke, of Milnsbridge, two months after a negative abdominal exploration had been made, the characteristic gall-stone attacks were persisting; and after each, temporary jaundice was noticed. In this case the gall-bladder had not been drained, hence no good resulted from the operation.

Dr. Byron Robinson describes a case* in which there were attacks of pain like cholelithic seizures, and which, he thought, were dependent on kinking of the common bile-duct, producing obstruction to the flow of bile into the duodenum, but which may probably be more readily explained on the hypothesis that it was a case of chronic catarrhal cholecystitis. It came on six months after the removal of gall-stones from the gall-bladder. On opening the abdomen, the gall-bladder, though free from stones, was found to be

* *American Medico-Surgical Bulletin*, April 18, 1896.

considerably enlarged, although the duct was patent, as proved by syringing water through it into the duodenum. Cholecystotomy resulted in recovery.

In these cases the gall-bladder is usually distended, but it rarely forms a distinct tumour, and there is an absence of pain on pressure over it. Unless gall-stones have been present at some time, there are usually no adhesions of the gall-bladder or ducts to the neighbouring viscera, proving that the inflammation has not extended through to the peritoneal coat, as it usually does when dependent on cholelithiasis.

This catarrh may be the sequence of gall-stone irritation, as in Cases 97 and 165, but in other instances may probably be due to the dependent position of the fundus of the gall-bladder, or to chronic constipation and accumulation of fæces in the hepatic flexure of the colon interfering with the regular emptying of the gall-bladder.

In all probability, in not a few of the cases where adhesions are found around a contracted gall-bladder, and no concretions are met with, the attacks are kept up by catarrh of the gall-bladder and ducts, which it is next to impossible to diagnose from the ordinary gall-stone seizures. Case III is a good example. The benefit derived from a systematic course of treatment in these cases renders it advisable that medical should always precede surgical treatment.

The diagnosis from cholelithiasis may usually be made by observing that the attacks are less severe and less prolonged than in true gall-stone seizures; that no gall-stones are found in the evacuations after an attack; that jaundice seldom supervenes, and if it does is only very slight; that there is no tenderness on pressure between the ninth costal cartilage and the umbilicus; and that the affection will usually completely yield to treatment. Should medical treatment fail to relieve, it may be difficult to distinguish chronic catarrh of the gall-bladder from cholelithiasis; but if, under the belief that the case is one of gall-stones, the gall-bladder be exposed, and no concretions found, drainage of the gall-bladder will be likely to effect a cure.

In chronic catarrh of the gall-bladder, regular exercise,

massage over the hepatic region, the avoidance of anything tight around the waist which will increase the dependence of the fundus of the gall-bladder, careful regulation of the diet, and the judicious employment of saline aperients, should be in all cases adopted.

The spasmodic attacks may require the administration of a sedative; and in some cases, like those referred to, nothing short of a subcutaneous injection of morphia will do any good.

If after a few weeks of general treatment the symptoms are not relieved, the case will probably be thought to be one of gall-stones, and operative treatment may be considered advisable.

If the gall-bladder and ducts be found free from gall-stones, cholecystotomy and drainage should, nevertheless, be performed; and it will be found useful after the third day to gently syringe a little warm water, previously rendered sterile by boiling, through the drainage-tube daily so as to wash out the ducts; and after a fortnight or more the tube may be left out, and the wound allowed to close.

General treatment directed to the cause should be continued for some time afterwards. In fact, obstinate catarrh of the gall-bladder should be treated like catarrh of the urinary bladder, first by medical and general remedies; and these failing, physiological rest should be secured by means of drainage.

CROUPOUS INFLAMMATION OF THE GALL-BLADDER AND BILE-DUCTS.

It had been noticed as far back as 1820 by Dr. Richard Powell (Medical Transactions of the College of Physicians) that membranous or croupous enteritis was frequently associated with attacks simulating gall-stone seizures; and Mr. Jonathan Hutchinson in his 'Archives of Surgery,' in commenting on this paper, suggests that in some of these cases a *bonâ-fide* attack of gall-stone colic may have been the cause of the membranous enteritis.

From a number of cases that we have seen and observed, some of them having been submitted to operation without finding gall-stones, but where there was abundant evidence

of inflammation of the gall-bladder and bile-ducts, we have formed the opinion that the cause of the painful attacks, followed by slight jaundice in these cases of membranous enteritis, is the formation of membrane in the bile-passages, which, partly obstructing the bile-flow, sets up spasms of the gall-bladder just as a gall-stone or even a lump of tenacious mucus will do, as shown in the cases mentioned in the chapter on chronic catarrh of the gall-bladder, where operation was undertaken for, and led to the cure of, attacks of pain dependent on chronic catarrhal cholecystitis.

Owing to the disintegrating effect of the bile and the intestinal secretion, it seldom happens that a true cast of the gall-bladder or bile-ducts is discovered, as in the following case related by Dr. Clennell Fenwick* of Christ Church, New Zealand, concerning a patient he had seen with Dr. Brittin.

'A. B., æt. 29, has had nine attacks of biliary colic in the last fourteen months, accompanied by more or less severe jaundice. During the first two attacks he passed on each occasion a fairly large faceted gall-stone. The fæces had not been examined during the later illnesses; but from the severe pain and the symptoms exactly resembling his earlier attacks, he feels sure that he has passed a stone on each occasion. Fourteen days ago he had a severe colic, necessitating the use of morphine, and next day passed a large piece of flesh, which was examined by his doctor, who describes it as an oblong sac with moderately thick walls, stained green, about 2 inches long and 1 inch broad, resembling the gall-bladder in shape. Ten days later he was again seized with severe pain, similar to that experienced in all the former illnesses, and after some hours of agony he was relieved, and next day passed another cast, which I examined. It is 2 inches long, $1\frac{1}{2}$ inches in breadth, its walls are $\frac{1}{10}$ inch thick; it is a closed sac with a distinct neck, and is stained bright green in parts, especially towards the neck. When laid out it appears to resemble a gall-bladder. The accompanying fæces were clay-coloured, and had been so for a long period of time. There was no microscopic appearance of hydatid structure, and I do not think that it

* *British Medical Journal*, April 23, 1898.

was an intestinal cast. We came to the conclusion that both these casts were derived from the gall-bladder, as the patient had suffered from typical biliary colic many times before, and described the pain experienced before the passage of the casts as exactly similar to that he had felt before he passed the gall-stones.

‘It does not seem improbable that the presence of the stones has set up a chronic inflammation in the bladder which has resulted in the formation of a false membrane, which has itself been expelled after the last stone had been passed.’

Dr. Powell, in the paper referred to, describes the symptoms as follows :

‘The more violent seizures under which I saw all the patients consisted in a sudden and excessive pain in the epigastric region, coming on in paroxysms very frequently repeated, rather relieved by the pressure of the patient herself at the time, but leaving great soreness and tenderness during the intervals. This state continued for about four days, and during the attack the stomach was very irritable and the tongue coated and clammy. Jaundice came on at an early period, and the stools were white, brown, or somewhat greenish, and streaked in colours, until the films began to pass, when they were mixed with a full quantity of bile, but not at first of a healthy colour.’

Dr. Powell further remarks :

‘The formation of adventitious membrane has not been so frequently observed in the intestinal canal as it has in circumscribed cavities, and I know not that any description of the symptoms accompanying such a state has heretofore been given. The appearance which comes nearest to it, both in resemblance and situation, is the membrane formed in the trachea under croup, but the symptoms are there more violent and destructive from locality of situation.

‘Whenever violent pain takes place in the epigastric region of the abdomen, exacerbating in paroxysms, accompanied by sickness, yellowness of the eyes, skin, and urine, by clay-coloured fæces, and without any proportionate increase of action in the circulation, biliary concretions are supposed

to be forcing their way through the ducts, and when these symptoms abate, it is inferred that their passage into the duodenum has been effected.'

After this Dr. Powell proceeds to state that he has often been disappointed in not finding a gall-stone in the fæces, and has found instead what he proceeds to describe :

'In the cases to which I refer this residue has exhibited a large quantity of flakes, mostly torn into irregular shapes and appearing to have formed parts of an extensive adventitious membrane of no great tenacity or firmness. In the first of the cases which came under my notice, this membrane was passed in perfect tubes, some of them full half a yard in length, and certainly sufficient in quantity to have lined the whole intestinal canal. In the others also the aggregate quantity has been very large, and it has continued to come away for many days ; but it has been in irregular thin flakes of not more than 2 inches extent, and not, as far as I could discover, of the perfect tubular form (which would probably also have been broken down by the agitation in water, if it had existed on its first passage out of the body).

'I have definitely examined four such cases, in all of whom the leading symptoms have been similar, and these have led me to suspect the passage of biliary concretions at the time. They have all been adult females, and have occurred in private practice. I had attended but one of these previous to this particular attack, and she had frequently suffered from occasional pain in the intestines and derangement of her powers of digestion, with flatulence and a sense of suffocation. She was always relieved at the time by mild opening medicine, and believed herself able to prevent the attacks.'

It is, of course, possible to have membranous enteritis and colitis without the bile-channels participating ; but when the combination of symptoms previously mentioned does occur, there can be little doubt that the bile-passages have become involved in the inflammatory process, and under these circumstances the symptoms will demand treatment.

Diagnosis.—As the symptoms so exactly resemble gall-stone attacks, the disease can only be differentiated by an examination of the evacuations, when the discovery of membranous

intestinal casts will raise the suspicion of croupous cholecystitis or choledochitis. Should a cast of the gall-bladder be discovered, the diagnosis will be rendered certain, but in the absence of such positive evidence the possibility of gall-stones being also present will be entertained.

In Case 166 the patient, a man, aged thirty-six, had suffered from attacks of paroxysmal pain in the upper abdomen which exactly simulated ordinary biliary colic. No gall-stones had been found in the motions; but for some time before operation membranous casts had been found in the stools after his attacks of colic. When examined, no tumour could be made out, but the right rectus was rigid in its upper half. At the operation no gall-stones were found, but there were adhesions of the gall-bladder to the omentum, duodenum, and colon, which, in association with the catarrh of the bile-passages, was quite sufficient to account for the attacks simulating gall-stones. The patient was cured by the operation, and remains quite well.

Case 215 was of a somewhat similar character, but in it there was associated cholelithiasis. The patient was a lady, aged forty-seven, and her first attack of gall-stone colic had occurred about two years before operation. Similar seizures took place frequently, gradually increasing in intensity and lasting longer. Towards the end of her illness membranous casts were found in the motions.

On examination there was the usual local tenderness, and the gall-bladder could be felt to be slightly enlarged. At the operation there were found 78 stones in the gall-bladder, cystic and common ducts, and numerous adhesions.

Treatment.—If under treatment by saline aperients, such as Carlsbad salts given the first thing in the morning and careful dieting, the symptoms do not abate, the question of drainage of the gall-bladder by cholecystotomy will be well worth considering (as in Case 215), and at the time of operation adhesions of the gall-bladder to the neighbouring viscera, which will probably be found (as in Case 166), should be broken down.

In both cases referred to, operation was followed by marked relief, and by entire cessation of the attacks resembling

cholelithic seizures, though in Case 166, after a year and a half, there was a repetition of intestinal colic, followed by the passage of some membrane in the fæces, the attack coming on as a result of exposure to cold and wet along with irregularities in diet; but with the intestinal colic it is interesting to note that there was none of the old biliary colic.

SUPPURATIVE INFLAMMATION OF THE BILE-PASSAGES, AND ITS RELATION TO MICRO-ORGANISMS.

Suppurative Inflammation of the Bile-passages.

At first sight suppurative inflammation of the gall-bladder and bile-ducts would seem to be capable of description in small compass and under one heading, but the subject is by no means so simple as it would appear.

For instance, simple empyema or suppurative catarrh of the gall-bladder, which is closely allied to suppurative cholangitis, differs in its clinical characters markedly from phlegmonous cholecystitis, which, however, is also associated with pus in the gall-bladder, that may quite properly be called an empyema, but which is one of the most fatal of diseases if not operated on expeditiously, as not only is there a tendency to gangrene, but to a rapidly-spreading lethal peritonitis.

The different clinical characters of suppurative inflammation can probably be accounted for by the presence or absence of certain organisms.

It has been supposed that the bile is an antiseptic fluid, which tends to prevent decomposition in the alimentary canal; but in a series of observations* published some years ago on a case of biliary fistula, it was noted that the absence of bile from the intestine of a woman during a period of fifteen months did not lead to any irregular fermentative process, showing that the alleged antiseptic effect of bile on the fæces is probably imaginary.

Normal bile is, however, generally sterile. This was proved

* 'Observations on the Secretion of Bile in a Case of Biliary Fistula,' by Mayo Robson (Proceedings of the Royal Society, vol. xlv.).

in 1884 by Netter,* who experimented on dogs; and the fact has been confirmed by Gilbert and Girode,† and later by Naunyn,‡ who found it sterile in two cases within a few hours of death.

Frequent inoculation experiments on animals have confirmed these observations, thus explaining a well-known fact, that in many cases bile has been extensively poured out into the peritoneal cavity without setting up peritonitis; but the fact of healthy bile doing no harm for a time must not lead operators to be careless of extravasation when operating for disease of the gall-bladder or bile-ducts, as in such cases the bile is seldom or never sterile, and in that condition it is capable of producing severe peritonitis.

In a case of mucous fistula following operation for stricture of the cystic duct, the constant clean appearance of the edges of the fistula suggested the idea that the fluid secreted by the gall-bladder might possess antiseptic properties; and the observation that, when collecting the fluid for experimental purposes, the flasks could be left exposed to the air for several days without any apparent change suggested the same conclusion.

Professor Birch, of the Yorkshire College, who was supplied with some of this fluid, performed numerous cultivation experiments, and came to the conclusion that its antiseptic properties were slight, the want of change being probably due to poverty of the fluid in nourishing materials.§

Bloch has demonstrated that the bile in cases of disease of the gall-bladder or bile-ducts always contains micro-organisms; hence he thinks it advisable to perform cholecystotomy in two stages, in order to avoid soiling the peritoneum and producing infective peritonitis.

When the flow of bile along the ducts is arrested, micro-organisms often invade the gall-bladder either from the blood or the intestine.

Charcot and Gombault|| demonstrated organisms within

* *Progrès Médical*, 1886. † *Comptes Rendus, Soc. Biol.*, 1890, No. 39.

‡ 'Klinik der Cholelithiasis,' 1892.

§ *Journal of Physiology*, No. 7.

|| *Archives de Physiologie et Pathologie*, 1876, p. 453.

it after ligaturing the common duct in dogs. This was confirmed by Netter* in 1886, who found that, twenty-four hours after aseptic ligature of the common duct in dogs, organisms (both staphylococcus and *B. coli commune*) could be cultivated from the bile. In 1886 M. Galippe found microbes in biliary calculi.

The *B. coli commune* exists normally in the human body, and is said to be the most abundant and most constant of the bacteria found in man in health. It has been demonstrated in every part of the alimentary canal, from the mouth to the anus. It varies greatly in its virulence, and in experiments on animals it appears to be harmless when taken from the normal intestines. If, however, the intestine or its diverticula become the seat of any morbid conditions, then the bacterium becomes at once virulent. At one time, as shown by Escherich,† it may act as an ordinary pyogenic organism, producing local abscesses; at another, as an active pathogenic germ, producing fatal septicæmia.

In simple catarrhal empyema of the gall-bladder, organisms, though probably present, are not always easily discovered; for instance, in a case (No. 106), where a tumour of the gall-bladder had been present for a year, and from which were removed sixteen gall-stones and 2 ounces of thick, creamy muco-pus, Dr. Buchanan failed to find any organisms.

In this case the walls of the gall-bladder were not thickened, and the serous coat was free from inflammation. Moreover, there were no adhesions, except over the cystic duct, where the largest gall-stone had been impacted.

On the other hand, Mr. C. B. Lockwood‡ found streptococci and other organisms, but no *Amœba coli*, in an empyema of the gall-bladder.

Netter§ found staphylococci and streptococci present in pathological human bile, and Martha,|| Gilbert and Girode,¶

* *Progrès Médical*, 1886, p. 992.

† *Fortschritte der Medecin*, 1885.

‡ *Lancet*, March 2, 1895.

§ *Archives de Physiologie Normale et Pathologique*, 1886.

|| *Ibid.*

¶ *Comptes Rendus, Société de Biologie*, 90 and 91.

and Bouchard* have found the *B. coli commune* in the bile in cases of inflammation of the biliary passages.

Terrier states that he has proved organisms (both *B. coli commune* and streptococci) to be present in all cases of inflammation of the bile-passages.†

In acute or phlegmonous cholecystitis the walls of the gall-bladder are swollen and œdematous, and may be infiltrated with pus. In three out of five of such cases Naunyn found the *B. coli commune* in the pus.

Bonnecken in 1890 demonstrated these organisms in the sac of a strangulated hernia, although there was no perforation.

All surgeons are familiar with the occurrence of suppurative peritonitis in cases of appendicitis, where, after removal of the vermiform appendix, the most careful examination fails to reveal any perforation. Similarly Barbacci has shown that peritoneal sepsis may occur by infection from within the intestine without any direct communication between its lumen and the peritoneal cavity. In both these cases, however, it is probable that there is always some amount of necrosis of the epithelial lining of the gut. The spread of infection through the walls of the gall-bladder can readily be explained on the same hypothesis, showing how virulent peritonitis may arise in these cases though there be no perforation.

Drs. Gilbert and Girode‡ found typhoid bacilli in the pus from a case of empyema of the gall-bladder, which came on as a sequence of enteric fever.

Gilbert and Dominici also§ assert that they produced supuration in the gall-bladder and liver of rabbits by injecting a culture of typhoid bacilli into the common duct. (See p. 154.)

These biological facts are borne out by the clinical observations of Dr. Murchison and Dr. Hale White, who had found evidence of inflammation and ulceration in the gall-

* *Comptes Rendus, Société de Biologie*, 1890.

† *Revue de Chirurgie*, 1895, p. 965.

‡ Biological Society of Paris, December 2, 1893.

§ *Ibid.*, December 23, 1893.

bladder in well-marked and fatal cases of typhoid fever, there being no obstruction to the passage of bile, or other cause than the specific disease, to account for the trouble.

Chiari* investigated systematically a series of twenty-two cases of typhoid fever. With the exception of three cases—one of which was in the infiltrating, and two in the necrotic, stage—he obtained typhoid bacilli invariably out of the gall-bladder, and in fifteen cases they were obtained in pure culture. They were generally present in considerable numbers. In thirteen of the nineteen cases in which a positive result was obtained, there was inflammation of the gall-bladder with small-celled infiltration, œdema, and hyperæmia. In all twenty-two cases the diagnosis of typhoid fever was confirmed by cultivations from the spleen, mesenteric glands, or liver, or from the larger bile-ducts.

How do bacteria reach the gall-bladder?

There are three possibilities: either they enter by the bile-ducts, or from the blood, or they reach the interior directly through the wall of the gall-bladder. The last-mentioned manner must be very exceptional, even if possible. Their entrance from the blood has been apparently disproved, and it is therefore extremely probable that they enter by the bile-ducts.

There is no doubt that typhoid bacilli multiply in the gall-bladder, and it is probable that they may be responsible for post-typhoidal cholecystitis, and chronic catarrh of the gall-bladder and bile-ducts, as well as for the formation of gall-stones. (See Chapter V.)

Simple Empyema.

Suppurative catarrh, or simple empyema, of the gall-bladder, or suppurative cholecystitis, is, as a rule, associated with gall-stones; but tumours of the bile-ducts, typhoid and other fevers, and other unexplained conditions, may also be the predisposing factors, though infection by pyogenic organisms is probably in every case the true exciting cause.

Empyema of the gall-bladder must always be looked on

* *Zeit. f. Heilk.*, Bd. 15, p. 199.

as a serious affection, both on account of its causes and its sequelæ, but from a clinical standpoint there is one form which is decidedly less serious than the other. The less serious will be discussed first under the term 'simple empyema of the gall-bladder'; the more serious form will be considered later as a distinct and special disease under the name of 'phlegmonous cholecystitis.'

When we bear in mind Charcot and Gombault's experiments on ligature of the common duct in dogs, just referred to, the wonder is that all impacted gall-stones are not associated with empyema, yet such is not the case, and it is only in a certain small percentage that the catarrh passes on to suppuration.

When there is an obstruction or any irritation in the cystic duct, a simple empyema may result, but when the obstruction is in the common duct, it may be associated with suppurative cholangitis—the former being a local suppurative process, the latter an extremely serious disease, rapidly followed by general symptoms, and, unless treated by operation, usually ends fatally.

In simple empyema the symptoms will at first depend on the cause, and as this is, in the great majority of cases, cholelithiasis (Courvoisier found empyema to be caused by gall-stones in forty-one out of fifty-five cases), there will be the usual history of gall-stone seizures, followed by a swelling under the right lobe of the liver, and by a continued instead of an intermittent pain. (Cases 3, 27, 79, 100, 106, 134, 151, and 169 are good examples.)

At first the constitutional symptoms may be only slightly marked, and there may be no increase of temperature, though in other cases in the later stages, and in some from the commencement, rigors or chills with fever will point to the formation of pus. The difference in the two seems to be determined by the absence or presence of ulceration of the mucous membrane.

The patient may be driven to bed at an early stage on account of the pain on movement. The loss of appetite, fever, and general malaise, usually lead to loss of flesh and weight. As a rule, there is no jaundice or only a slight

icteric tinge, dependent on associated catarrh of the bile-ducts. Tenderness is nearly always present, in consequence of the local adhesive peritonitis, which is rarely absent.

The tumour, if seen at an early stage, will move with respiration, descending with the liver, and being felt as a rounded swelling. After a time the swelling may become more diffused and general, and the movements during respiration will be less marked, or may cease, owing to inflammation extending to the abdominal walls. If the suppuration extends beyond the gall-bladder, the pus may make its way through the parietes, and an abscess may form under the ribs, as in a case under the care of the late Mr. McGill in the Leeds Infirmary, where a superficial abscess was opened under the right costal margin, giving exit to a quantity of pus and a number of gall-stones. The pus usually, however, selects a more tortuous passage, and following the suspensory ligament of the liver, it reaches the umbilicus, as in Case 79, where in a lady of thirty-five, after a long illness, an abscess formed at the umbilicus and burst, discharging pus and mucus. There was nothing to show the origin of the trouble except a history of spasms for years, without jaundice. On laying open the fistula, a large number of gall-stones were readily removed from the gall-bladder. The patient remains in good health.

The abscess may even burst at a distance from its origin—for instance, over the pubes or over the cæcum.

There are generally peritoneal adhesions which prevent extravasation into the general peritoneal cavity, but the pus may make its way into neighbouring organs, as in Case 27, where it burrowed into the liver and formed an abscess, which was evacuated at the time of operation.

In King's College Museum, No. 1,706, is an example of a gall-stone which was removed from the pleura of a patient by Professor Rose, and as the patient had coughed up a quantity of bile-stained pus, an empyema of the gall-bladder had probably burst through the pleura, though no communication could be discovered after death, which occurred a few weeks after operation.

In one case seen with a colleague, a large subphrenic abscess

caused by an empyema of the gall-bladder becoming extravasated between the liver and diaphragm was successfully evacuated and drained.

If we bear in mind the pouch of peritoneum in front of the right kidney, it is not to be wondered at that a collection of pus should at times form in that region resembling a perirenal abscess, though inside the peritoneum and limited by adhesions. (Case 212 is an example.)

Needless to say, an abscess of the gall-bladder only requires treating on general surgical principles by opening and drainage; but, at the same time, the cause must not be overlooked, as it may often be removed at the same time that the abscess is evacuated.

Where the pus is in the gall-bladder, cholecystotomy will be advisable. After exposing the gall-bladder, it will be wise to aspirate before opening it, in order to avoid soiling the tissues with pus.

The walls of the gall-bladder may be found so friable as to be incapable of holding sutures, or there may be small abscesses in the inflamed wall of the gall-bladder itself; in such cases cholecystectomy may be required. In two cases of empyema of the gall-bladder, after the pus had been evacuated and the gall-stones removed, the cavity was packed with iodoform gauze, and although the peritoneal sac was widely opened, no harm resulted, as a lymph barrier was soon thrown out, limiting the only partly-disinfected area.

In abscess due to empyema of the gall-bladder, reaching the surface at some distance from the seat of origin, it may be wise at first simply to open and drain the abscess, and on some future occasion to perform cholecystotomy. This was the course successfully followed in Case 109.

In some cases of empyema the patient may not be in a fit condition to bear a prolonged operation, and it may therefore be wiser to perform a simple cholecystotomy and to defer the removal of the cause until an examination of the discharge shows it to be sterile or nearly so.

Acute Phlegmonous Cholecystitis and Gangrene of the Gall-bladder.

Acute or phlegmonous inflammation of the gall-bladder was described by Courvoisier in 1890, under the name of acute progressive empyema of the gall-bladder, and he states that it usually terminates fatally in a few days from diffuse peritonitis. Only seven cases are recorded in Courvoisier's statistics.

Potain* also mentions that, in addition to the ordinary variety of empyema of the gall-bladder, there is a very grave condition of acute empyema, which is followed by rapid peritonitis and death. In one case, which he describes, death occurred on the second day after the onset of the attack, and although there was no perforation of the walls of the viscus, infection had spread through the coats to the general peritoneal cavity.

Osler† refers to it as an extremely rare disease.

A case described by Mr. W. Arbuthnot Lane‡ affords a good example of phlegmonous inflammation simulating acute intestinal obstruction, or acute pancreatitis.

A man, aged fifty-four, was suddenly seized with abdominal pain immediately after a rather hearty meal.

This continued, and was accompanied by frequent vomiting. Next day the vomiting became less frequent, and then ceased ; ingestion of food, however, caused much distress and renewed vomiting.

The abdomen became much distended, and both pain and distension were now marked on the right side.

These symptoms increased in severity till the fourth day of the illness, when Mr. Lane first saw him. The bowels had not moved since the onset. He was now in a very prostrate condition, with a small rapid pulse and a very distended, painful, and tender abdomen, the hardness and fulness being most distinct about the right hypochondriac region and its vicinity.

* *Journal de Médecine et Chirurgie*, November, 1882.

† 'Principles and Practice of Medicine.'

‡ *Lancet*, February 25, 1893.

There was no previous history of gall-bladder trouble nor of intestinal obstruction.

From the distended condition of the small intestines and cæcum, with the collapse of the colon on the left side, the case was supposed to be one of obstruction about the hepatic flexure.

On opening the peritoneal cavity, a very thick layer of firm lymph covering the edge of the liver, and extending down over the adjacent transverse colon, was found, beyond which the colon was empty, contrasting with the distended condition of the proximal part of the bowel.

In immediate relation with the transverse colon and the duodenum, which was also covered with lymph, was found a tensely-distended, livid gall-bladder, which was not larger than normal, and was evidently very acutely inflamed.

The whole of the lymph was carefully removed, and the gall-bladder tapped of its contents, which consisted of a thick muco-pus. The opening was then enlarged, a drainage-tube inserted, and the margins of the wound stitched to the peritoneum. No gall-stone was discovered. The patient made a complete recovery.

In the *Lancet*, March 2, 1895, is a case reported by Mr. Marmaduke Sheild, which is more fully described under perforation of the gall-bladder, but which was doubtless a case of phlegmonous cholecystitis following on typhoid fever, in a woman, aged thirty-one, under the care of Dr. Monier Williams.

She was operated on, on the fifty-first day of the disease, when the gall-bladder was found to be rigid, thickened, and of a dark plum colour, containing $1\frac{1}{2}$ ounces of thick offensive pus; it was ulcerated and perforated. The abdomen was washed out and drained, complete recovery ensuing.

No. 2,806 in the Hunterian Museum is a case of typhoid cholecystitis, probably phlegmonous, as the peritoneal coat had much false membrane on it, like Mr. Lane's case, and pus was in the gall-bladder. It is from a case of typhoid fever, in which death occurred in the fourth week.

Case 176 is a good example of acute phlegmonous cholecystitis in a man, aged forty-seven, who had suffered from

gall-stone attacks for some years, had been severely ill for six weeks, and very acutely ill six days before operation.

The symptoms were those of an acute attack of local peritonitis in the region of the gall-bladder, with fever, depression, and general malaise, following on a severe gall-stone seizure. When exposed, the gall-bladder was found of a dark plum colour, with one or two greenish patches on its surface. It contained malodorous pus and nine gall-stones. The omentum and adjoining coils of intestine were coated with lymph, thus limiting the inflammation to a comparatively small area.

The concretions were removed and all the pus wiped away before the general peritoneal cavity was opened. Under free drainage the patient made an excellent recovery, and is now well.

Another case (No. 194), in which the symptoms were subacute and dependent on gall-stones, illustrates the intermediate stage between ordinary empyema and acute phlegmonous cholecystitis. The gall-bladder was dark-coloured, covered with lymph, and contained offensive pus. Removal of the gall-stones and drainage led to complete recovery, and the patient is now quite well.

Etiology.—Although the condition is usually associated with gall-stones, acute cholecystitis may arise quite independently—in this way resembling appendicitis, which may occur without the presence of foreign bodies.

Typhoid and typhus fevers, cholera, malaria, sepsis after operation, puerperal fever, and other unknown conditions, may give rise to it.

Symptoms.—Whatever be the cause, the disease usually manifests itself somewhat suddenly, with pain on the right side of the abdomen, rapidly becoming general. A rapid and feeble pulse, quick thoracic breathing, fever, intense depression, marked tenderness on pressure (especially over the right side of the abdomen), rapidly developing tympanites, persistent vomiting, and an extremely anxious expression of countenance, are usually present.

The acute peritonitis, which is significant of the disease, may be localized at first, but later becomes general.

Jaundice may or may not be present, and although an elevation of temperature is usual, it is by no means constant, and affords only slight assistance in the diagnosis or prognosis.

If the disease be of the very acute or gangrenous variety, death speedily occurs; but if of the subacute form, an abscess may develop around the gall-bladder, and the peritonitis may become localized, the disease then resembling a perityphlitic abscess in its course.

Diagnosis.—The diagnosis of phlegmonous cholecystitis practically resolves itself into the diagnosis of the cause of acute peritonitis, starting on the right side of the abdomen.

Although this may be due to perforation of the stomach at or near the pylorus, to perforation of the duodenum or ascending colon, to perforation of the gall-bladder or bile-ducts, and to other such-like peritoneal catastrophes, the chief affection for which it is likely to be mistaken is acute appendicitis.

In appendicitis the pain begins at a lower point in the abdomen, and passes towards the umbilicus; whereas in gall-bladder trouble it begins below the right costal margin, and passes towards the epigastrium and back to the right scapular region.

In all gall-bladder inflammations there is almost invariably a tender spot a little above and to the right of the umbilicus, or, to be more exact, at the junction of the upper two-thirds with the lower third of a line drawn from the ninth rib to the umbilicus.

In appendicitis there is in the same way a tender spot at the junction of the outer third with the inner two-thirds of a line drawn from the umbilicus to the anterior superior spine of the ilium, known as McBurney's Point.

The symptoms of acute peritonitis and paralytic obstruction of the bowels are common to both. Fortunately, the treatment by exploratory incision is appropriate to the various conditions mentioned, so that no serious error is likely to arise in case of mistaken diagnosis.

Treatment.—Relief of pain by subcutaneous injections of morphia will probably always be demanded as a primary

measure, and as it is clearly impossible to make a diagnosis of the serious condition within the first few hours, warm applications should be used, and absolute rest enjoined, all feeding by the mouth except in small quantities being stopped, and the relief of symptoms as they arise being attended to; but as soon as the diagnosis of phlegmonous cholecystitis can be established, and it is found that the patient is getting worse, an exploratory incision should be made, and the gall-bladder incised and drained, the cause if found being removed.

If, however, gangrene be discovered, the gall-bladder should be excised, the indications for that measure being as distinct as in the case of a gangrenous vermiform appendix.

If, in the subacute cases, the inflammation becomes localized, and a swelling with tenderness be found beneath the right costal margin, incision and drainage is called for, when at the same time cholecystotomy may be performed, and if gall-stones be present in the gall-bladder or ducts, they may be removed. If the patient be too ill to bear a prolonged operation, the latter procedure may be left to a subsequent occasion.

Gangrene of the Gall-bladder is probably only an extreme degree of phlegmonous cholecystitis.

The comparative frequency of gangrene in the vermiform appendix might lead one to suppose that gangrenous inflammation of the gall-bladder would not be uncommon; yet it is extremely rare, and, so far as we know, the case reported by Dr. L. W. Hotchkiss in the *Annals of Surgery*, February, 1894; is the only one recorded, unless Case 176 may be called one of gangrenous cholecystitis, for the green patches in the gall-bladder would seem to indicate that the gangrenous process had supervened.

In Guy's Hospital Museum there is a well-marked specimen of gangrene of the gall-bladder (No. 1,397). The mucous membrane is dark brown, and there are gangrenous patches on the serous surface. The common duct was obstructed by growth, and the patient, who had been under the care of Dr. Moxon, had been jaundiced for three months.

In Dr. Hotchkiss's case, a boy, aged nineteen, was admitted to the Belle Vue Hospital, New York, with acute peritonitis,

which had come on suddenly, and was thought to be due to appendicitis, as the pain was most severe over the cæcal region. No previous history of gall-stones was obtainable.

Exploration of the abdomen revealed a tumour of purplish hue, very tense, and markedly congested. Some pus was found on its outer side, and within it thin, sticky fluid of a yellowish-brown colour, together with a number of gall-stones. The lower end of the gall-bladder was almost black, and its walls extremely thin and apparently gangrenous.

Death occurred seven hours after the operation, and thirty-four hours after the onset of the attack, the vomiting, rapid pulse, and high temperature continuing to the end.

In order to explain the occurrence of gangrene, three factors have to be borne in mind :

- (a) Thrombosis of the nutrient vessels.
- (b) Bacterial infection.
- (c) Absence of drainage (and therefore tension).

The two latter are present in both gall-bladder and appendix inflammation, but the first factor is more frequent in the vermiform appendix, which is only supplied by one nutrient artery, whereas the gall-bladder has a very free blood-supply, not only through the branches of the cystic artery, but also through their anastomoses with the hepatic vessels, where the gall-bladder is fixed to the liver.

In Dr. Hotchkiss's case there was an abnormal circular constriction of the gall-bladder with lymph infiltration, which was apparently sufficient to cut off the blood-supply from the extremity of the gall-bladder.

Infective Cholangitis.

Infective cholangitis, or infective catarrh of the bile-ducts, is usually due to gall-stones in the common duct, which favour the entrance of organisms from the intestine through the duodenal orifice.

Courvoisier, Osler, and Fenger, have each described the ball-valve action of gall-stones in a dilated common bile-duct, thus accounting for the intermittent character of the jaundice and the irregular course of the disease.

Charcot was one of the first to describe the disease under the name of intermittent hepatic fever.

Although this condition in which the gall-stones are freely movable in the common duct does occur in infective cholangitis, it is, in our experience, much more common to find a number of gall-stones more or less impacted.

The usual history is one of 'spasms' for several years, without jaundice; then comes a more severe seizure, followed by temporary icterus. If the gall-stone passes, there is an end of the trouble; but if not, the next attack of pain is probably immediately followed by a shiver, and by all the symptoms of an 'ague fit,' the temperature frequently reaching 104° or 105° . After it has passed off, the skin is more deeply tinged, and the jaundice may persist, though it varies in degree; it rarely, however, completely disappears between the attacks, there being usually a slight icteric tinge of the conjunctivæ, even though the interval between the attacks may be one of weeks or months. The rigors may be repeated daily, or at irregular intervals.

The gall-bladder may be felt as an enlargement below the right costal margin; but this is not usual, as where there are gall-stones it is more common to find the gall-bladder contracted. The liver at first is not enlarged, but later its lower margin may descend considerably.

Tenderness over the gall-bladder or in the epigastric region can generally be elicited. There is usually well-marked loss of flesh and strength, and if unrelieved by Nature or art, the disease may run on into suppurative cholangitis and its complications.

Infective cholangitis may persist off and on for years, and may end in recovery; but, on the other hand, it may assume an acute form, and lead to death from pain, biliary toxæmia, and exhaustion. The complications which may follow are suppurative cholangitis, diffuse hepatitis, abscess of the liver, cholecystitis and empyema of the gall-bladder, perforation of the ducts, endocarditis, pleurisy, pneumonia, and other septic diseases.

Diagnosis.—Ague, being rare in England, is not so readily thought of as it is in countries where malaria is endemic;

but the regularity of the chills, and the slight jaundice and enlargement of the spleen in some cases, will usually suggest it, though the pain and tenderness, the history of cholelithiasis, and the absence of relief by large doses of quinine, soon settle the doubt.

As infective diseases in the bile-passages are prone to end in suppuration, abscess of the liver and suppurative cholangitis may supervene; but the more prolonged course of infective cholangitis, the comparative good health between the attacks, the irregularity in the course of the disease, and the absence of rapid and progressive deterioration of health, will usually enable a diagnosis to be made.

When suppuration exists, there are usually increased tenderness over the liver area, continued or irregular intermittent fever, and intense and persistent jaundice.

Treatment.—If possible, the cause should be removed; but should this prove impossible, the ducts can be drained. Fortunately, this may be accomplished with every prospect of success if, as is commonly the case, the disease be gall-stones. Cases 56, 57, 92, 136, 153, 161, and 162 are good examples of the issue of such treatment.

There can, however, be no doubt in the minds of those who have observed many of these cases that it is better to anticipate the complication, and as soon as medical treatment has been fairly tried and failed, the removal of gall-stones by surgical means should be resorted to.

Suppurative Cholangitis.

Suppurative Cholangitis, or Suppurative Catarrh of the Bile-ducts, is a subject of deep interest, and the disease of serious import, not only on account of its causes, but from the combined effects of biliary obstruction and stagnation, with septic infection, and their local and constitutional effects.

Etiology.—Cholelithiasis is by far the most common cause, and in the museums there are several cases illustrating it. Specimen No. 1,418 in Guy's Museum shows dilated hepatic ducts containing pus and many dark-coloured gall-stones, the ducts throughout the liver being inflamed and dilated, and there being several abscess cavities; one gall-stone is

free in the common duct. The specimen was taken from a woman, aged thirty, who had enteric fever five months before death. At first she had an enlargement of the gall-bladder, which, however, disappeared. Death occurred from pyrexia, accompanied by rigors.

Case 236 affords a good example of infective cholangitis, dependent on gall-stones, passing on to suppurative cholangitis, in which, although the gall-stones were thoroughly removed from both the common and hepatic ducts, and the pus and infected bile freely evacuated, the patient, who had heart disease and albuminuria, was too far reduced by her illness to withstand the operation, which offered the only chance of recovery.

Case 12 is interesting as being a well-marked case, in which the disease was dependent on gall-stones, followed by cancer of the common bile-duct. Though temporary relief was given by drainage, the patient ultimately succumbed to the disease, and at the autopsy the bile-ducts throughout the liver were found full of pus.

But, besides gall-stones, hydatid disease, ascarides, cancer of the bile-ducts, typhoid fever, and influenza may cause suppurative cholangitis, and it is probable that the disease not infrequently complicates other acute infectious ailments.

Hydatid Disease causing infective cholangitis is apparently not rare, as the specimens in many of the museums show.

No. 2,252, St. Bartholomew's Museum, shows a hydatid membrane rolled up and blocking the common bile-duct, a portion of it projecting into the duodenum. There was a large hydatid cyst in the right lobe of the liver. It was taken from a boy, aged fourteen, who died from jaundice, accompanied by pain, fever, and delirium. Three months before death he was said to have hepatitis (Fig. 11).

No. 1,384, Guy's Museum, shows a hydatid cyst opening into the hepatic duct, a piece of hydatid membrane projecting through the papilla into the duodenum. The ducts throughout the liver are dilated and filled with pus. It occurred in a man of fifty, who had jaundice a month before admission, and died a week after.

No. 196A, St. George's Museum, and No. 1,582, Middlesex Museum, are also examples.

Case 161 is an example of successful operation for infective cholangitis dependent on hydatid disease.

Mr. Jonathan Hutchinson junior operated on a young woman suffering from intense paroxysmal pain with high temperature and sickness, in whom the gall-bladder could be



FIG. 11.—HYDATID, ROLLED UP AND BLOCKING COMMON BILE-DUCT, PORTION PROJECTING INTO DUODENUM.

Taken from a boy of fourteen, who had a large hydatid cyst in right lobe of liver. Death from suppurative cholangitis. (No. 2,252, St. Bartholomew's Museum.)



FIG. 12.—INFECTIVE CHOLANGITIS, SHOWING DILATED INTRA-HEPATIC DUCTS.

Cause—cancer of ampulla of Vater. (No. 1,307A, St. Thomas's Museum.)

felt; it was very tense. Cholecystotomy was performed, and numerous hydatids let out. An opening could be felt between the cyst in the liver and the gall-bladder. Pus escaped with the bile for a time, but the patient is now well.

Ascarides in the Bile-ducts.—Mertens has collected* forty-eight cases in which ascarides have been found in the bile-ducts. In only five cases were there symptoms pointing to the presence of gall-stones, and in two only was the cause of the symptoms determined during life. Mertens' patient, a woman, aged thirty, was admitted into hospital after her third attack of biliary colic, which simulated closely an ordinary gall-stone seizure, beginning with pain in the gall-bladder region associated with vomiting and followed by jaundice. On admission both the liver and spleen were enlarged, and the gall-bladder could be made out, though it was not tender. There was present almost, but not quite, complete obstruction to the flow of bile into the intestine. Pleurisy with effusion occurred on the right side, and was followed by the development of ascites and œdema of the legs. The patient rapidly lost strength for seven weeks, and the jaundice became very marked. Then two partially-macerated round worms were found in the stools, and the patient rapidly began to improve, ultimately getting quite well.

The other case, the cause of which had been diagnosed during life, showed the ordinary signs and symptoms of suppurative cholangitis; but in addition round worms were vomited and also found in the motions. The child ultimately died, and post-mortem examination revealed dilated bile-ducts, with multiple abscesses in the liver.

Mertens' supposition, that the worms were enabled to enter the common duct from the duodenum by reason of the ducts having been dilated by the previous passage of gall-stones, seems to be the most likely explanation of their presence in such an unusual situation.

Malignant Disease is a common cause.

There is an excellent example (I,307A) in St. Thomas's Hospital Museum, where the ducts throughout the liver are dilated and filled with pus, the infective cholangitis being dependent on malignant disease of the papilla of the common bile-duct (Fig. 12).

Case 12 is that of a man, aged forty-two, who suffered from

* *Deutsche Med. Wochenschrift*, 1898, No. 23.

deep jaundice, with intermittent fever and ague-like attacks. Cholecystotomy gave relief, but the patient died a few weeks



FIG. 13.—INFLAMMATION OF GALL-BLADDER AND BILE-DUCTS IN TYPHOID.
Death in seventh week. (No. 1,395, Guy's Museum.)

after, when a growth of a malignant character was found in the common bile-duct, and the ducts throughout the liver were inflamed and filled with pus.

Typhoid Fever furnishes the museums with several specimens of infective cholangitis and cholecystitis.

No. 1,395, Guy's, is a specimen from a patient of Dr. Hale White's, and shows inflammation of the bile-passages and cholecystitis without any obstruction in the ducts. Death occurred in the seventh week (Fig. 13).

No. 1,594A in the Middlesex Museum shows inflammation and ulceration of the bile-passages in typhoid fever.

Influenza is not generally recognised as a cause; but cases have occurred in which the symptoms have been quite characteristic, and have come on within a few weeks after an attack.

The causes mentioned may truly be termed predisposing, since the true exciting cause is the presence of pyogenic organisms.

The *B. coli commune* produces an exudative inflammation of the ducts, and may actually cause abscesses within the walls of the biliary passages.

Hepatitis and liver abscess frequently follow on cholangitis, and this is usually followed by general and fatal infection of the system.

Endocarditis is at times set up, and as it has been known* to follow cholangitis without hepatitis, and cholangitis without abscess, this possible cause should never be lost sight of in any case of ulcerative endocarditis.

The bacillus in these cases in the vegetations on the inflamed endocardium has been found to be identical with the one found in the bile.

Jaccoud and Aubert† also found endocarditis present in cases of cholangitis.

Symptoms.—In suppurative cholangitis there is progressive enlargement of the whole liver, which may descend as low as the umbilicus, the swelling being uniform, smooth, and tender to pressure; but the enlargement may be masked by cirrhosis, as in a case‡ reported by Drs. Jones and Clinch. If the cause be in the common duct, and the gall-bladder has not previously become contracted, there will be the

* Netter and Martha, *Archives de Physiologie*, vol. ix., 1886.

† Clin. Med. de Lariboisière. ‡ *Edinburgh Med. Jour.*, April, 1895.

additional enlargement caused by its distension ; but when contraction has taken place, and also when the obstruction is in the hepatic duct, there will be an absence of the signs of empyema of the gall-bladder.

Pain may be entirely absent where the disease is associated with cancer of the common duct ; but where it is dependent on gall-stones, the pain may be severe and paroxysmal, each attack being accompanied by ague-like seizures and an intensification of the jaundice.

Jaundice is always present, and is usually both persistent and intense, though where the obstruction is a floating gall-stone acting like a ball-valve in the common duct, the jaundice may vary from time to time, and may almost disappear. Fever, with occasional rigors and profuse perspiration, forms a feature of the disease, and with this there is rapid loss of flesh and strength.

Pneumonia and pleurisy, ending in empyema, are serious and not infrequent complications of suppurative cholangitis. The disease is an extremely serious one, and usually proves fatal, though, if the cause can be removed at an early stage, recovery may occur.

If the course be less acute, the inflammation may concentrate itself in some part of the liver, leading to abscess, which may form a distinct tender swelling, and give rise to the usual symptoms and signs of hepatic abscess.

Treatment.—Unless free evacuation and drainage of the infected contents of the bile-passages can be accomplished, either naturally or artificially, treatment is practically useless. Therefore, if practicable, cholecystotomy should be performed, and free drainage established and continued until the bile is sterile, or nearly so.

Although good results cannot be expected in all cases, an amelioration of the symptoms may be looked for in a fair proportion, and complete relief in others.

If a localized abscess be discovered in the liver, it should be opened and drained, and though it is scarcely to be expected that operation can be always successful in these more serious cases, the chance of permanent benefit is worth snatching at, even in the most desperate conditions.

Of general means, warm applications to the hepatic regions, an initial mercurial purge followed by milder laxatives, intestinal antiseptics by administering bismuth and salol, the relief of pain by sedatives if called for, and the treatment of symptoms as they arise, will afford some amelioration, though they will probably only give temporary relief.

Although surgeons have been performing cholecystotomy for infective cholecystitis and for gall-stones producing infective cholangitis for some years (Cases 3, 6, and 12 described below, operated on in 1888, being early examples of this operation), it is only right that the chief credit of specially operating for cholangitis should be given to M. Terrier.

He writes in the *Revue de Chirurgie* for 1895, p. 966: 'Thanks to the opening in the gall-bladder, a certain number of important therapeutic results follow:

'*First.* The septic contents of the gall-bladder are evacuated.

'*Second.* Calculi, which are most frequently present there, are removed.

'*Third.* The other biliary passages more or less obstructed, either by calculi or by swelling of their walls, are rendered as free as possible.

'*Fourth.* The septic bile is allowed to escape, and mechanically washes out the lower passages, carrying away through the drainage-tube many of the infectious elements.

'*Fifth.* The relief of pressure prevents absorption of the septic matter.

'*Sixth.* The relief to the kidneys, by allowing the bile to escape freely, is also of importance, as they are thus enabled to perform their function more freely in relieving the system of septic and other materials.'

In the paper referred to, M. Terrier relates several cases with the utmost detail, especially interesting on account of the bacteriological examination of the discharge from the fistula at different dates, conclusively showing the gradual diminution in the virulence of the bile after the drainage has been proceeding for some days, and pointing to the need of rather more prolonged drainage than some of us have been

wont to employ, *i.e.*, until a bacteriological examination of the discharge shows it to be sterile, or nearly so.

Tubercular Cholangitis seems to occur as a rare condition, and apparently only as a sequel to tubercular infection of the intestine. Tubercles seem to form in the portal canals, and by extension to involve the bile-ducts and give rise to well-marked cholangitis. It is possible that in some cases of extensive tuberculosis of the intestine the infection may be direct, but the cases have mostly occurred in patients the subject of general tuberculosis, and in all probability the bacilli are carried by the blood-stream. As the lymphatic stream in the liver is toward the hilum, it is not likely that infection is brought in that way. This form of cholangitis is practically of little importance, as it forms merely a complication in what is necessarily a fatal condition.

Ulceration of the Gall-bladder and Bile-ducts.

Ulcers of the gall-bladder or bile-ducts vary greatly in number, size, and depth, as also in clinical importance.

They may be quite superficial, being mere abrasions of the epithelial lining of the mucous membrane, then being as a rule numerous and widespread, or they may be single and deep, extending into or through the muscular and serous coats. Between these extremes every variety may be found, as the specimens in the museum show very distinctly.

Although cholelithiasis is the most frequent, typhoid fever and cancer are quite common causes, and cholera is also said to produce ulcers.

The slighter cases of erosion are seldom seen, though doubtless they frequently exist in cases operated on for gall-stones, and in others where the concretions are passed naturally; but the severer forms of ulceration are more frequently met with as the immediate cause of death.

Ulceration is chiefly of importance on account of the serious sequelæ—stricture, perforation, fistula, peritonitis local or general, hæmorrhage, septicæmia and pyæmia.

The inflammation accompanying ulceration usually extends to the peritoneal coat at the site of the ulcer, and leads to a plastic peritonitis, which causes the adjoining organs to

adhere to the inflamed surface, thus in the greater number of cases keeping the peritonitis local.

Adhesions.—Some years ago it was pointed out* (Mayo Robson) that in nearly every case of gall-stones there are adhesions of the gall-bladder or ducts to neighbouring organs, showing that peritonitis is a frequent or nearly constant accompaniment of cholelithiasis. It is doubtless a salutary phenomenon, as otherwise general peritonitis would be much more common, especially in the many cases where the adhesions permit of fistulæ quietly forming between the contiguous viscera, and where localized abscesses form without general peritonitis.

The adhesions may, either by the anchoring of normally mobile organs or by subsequent contraction, themselves become sources of inconvenience or danger, as in the case of a lady of thirty-four (Case 97), who, besides suffering from severe spasmodic pain due to chronic catarrhal cholecystitis, had dilatation of the stomach owing to kinking of the pylorus, caused by adhesions passing between it and the gall-bladder. (See Fig. 25, p. 89.) After separation of the adhesions and drainage of the gall-bladder, complete recovery ensued.

Mr. Page, of Newcastle, recently described a similar case† in which an acute kink of the pylorus led to dilatation of the stomach, with vomiting and death. The gall-bladder, containing gall-stones, was adherent to the pylorus, and communicated with it through an ulcerated opening.

Case 219 is a good example of ulceration of the gall-bladder followed by adhesion to the stomach, and ending in a fistula between the gall-bladder and stomach. Persistent vomiting of bile, with repeated attacks of pain and great loss of flesh, resulted. At the operation, the gall-bladder was detached from the stomach, and the opening into the stomach sutured. A number of gall-stones were removed from the gall-bladder through the fistulous opening, which was brought to the surface, and used for the purpose of draining the bladder and ducts. The patient made a good recovery, and is now well.

* Clinical Soc. Trans., 1888.

† *British Medical Journal*, January 23, 1897.

In other cases (Nos. 54, 63, 88, and 130) the fibrous transformation of the lymph led to contraction with stricture of the pylorus, which was relieved by separating the adhesions; but in another case (No. 131) the strictured pylorus was so narrow that pyloroplasty had to be performed, and this effected a complete cure.

In another instance (No. 160), the adhesions between the gall-bladder and colon led to partial obstruction of the bowels, with frequent recurrences of colic, all relieved by separating the fibrous bands.

Case 199 is a good example of typhoidal cholecystitis being followed by adhesion of the gall-bladder to the hepatic flexure of the colon. The adhesions ultimately formed strong bands encircling the colon and causing obstruction, which was cured by their division.

On looking through the list of cases, it will be found that in fourteen instances adhesions were found to account for the symptoms, and that their separation usually afforded relief or cured the patients.

Peritonitis, though usually local in cases of cholelithiasis, may become general, either from perforation, as in cases to be related under that heading, or by extension to the peritoneum, through the non-perforated walls, as in cases related under the description of phlegmonous or gangrenous cholecystitis.

Under such circumstances prompt surgical treatment will be required, or death will speedily follow.

Hæmorrhage.—As the ulcer extends, the vessels usually become thrombosed, but occasionally severe hæmorrhage results, leading either to hæmatemesis or melæna.

The notes of the following fatal case were furnished by Dr. Peter McGregor, of Huddersfield.

A temperate man of forty-eight had suffered from gall-stone attacks since the age of twenty-six, but for a year had had no seizure, and had gained two stone in weight.

Without pain or other localizing sign, he began to vomit blood, and continued to do so two or three times a day until his death, which resulted from exhaustion in the third week.

An autopsy revealed contraction of the liver, with numerous

gall-stones in the gall-bladder. One, the size of a large filbert, had ulcerated through the walls of the gall-bladder, and was projecting into the peritoneal cavity. There was no peritonitis, and death was due to hæmorrhage from the margin of the ulcerated opening.

Specimen No. 1,389, Guy's Museum, shows the gall-bladder and bile-ducts of a woman of fifty-four, who, after being jaundiced for two months, suddenly became collapsed, with a rapidly-increasing swelling of the gall-bladder. This was opened by Mr. Lane on the fifth day, and was found to be filled with blood-clot. She died a few hours after, when the bleeding was found to have proceeded from a laceration in a softened and ulcerated gall-bladder.*

It is to be borne in mind that hæmorrhage is predisposed to in these cases by the aplastic condition of blood occurring in long-standing jaundice.

As ulceration is always associated with the presence of pyogenic organisms, septic absorption usually occurs, leading to constitutional disturbances in the shape of septicæmia and pyæmia, as described under infective cholangitis.

Although cancer may lead to ulceration, it seems probable that long-standing ulceration of the gall-bladder or bile-ducts may predispose to malignant disease, as they are so frequently associated. This subject is more fully discussed under the heading of Tumours.

A specimen illustrative of ulceration (No. 2,263, St. Bartholomew's) shows a circular ulcer in the gall-bladder, dependent on gall-stones.

No. 2,263A, St. Bartholomew's, shows many small ulcers, with one larger, that has perforated, and caused death from peritonitis. The walls of the gall-bladder are greatly thickened, and there is a cholesterine coating, but there are no gall-stones. The patient was a man of sixty-seven.

No. 1,675, King's College Museum, shows numerous ulcers due to gall-stones.

The specimen from Case 8 of Mr. Warner's Jacksonian Essay, now in the College of Surgeons' Museum, shows numerous small ulcers with biliary gravel, but no gall-stone.

* Clinical Soc. Trans., 1895, p. 160.

One small ulcer, the size of a pea, had perforated, and pus was found outside the gall-bladder. The patient had been ill for two weeks.

No. 1,594A, Middlesex Museum, affords a beautiful example of deep ulcers due to typhoid fever (Fig. 14).

No. 1,021, St. Mary's Museum, shows an epithelioma of the gall-bladder, with a perforating ulcer, occurring in an



FIG. 14.—TYPHOID ULCERATION OF GALL-BLADDER.

(No. 1,594A, Middlesex Museum.)



FIG. 15.—PERFORATING EPITHELIOMATOUS ULCER OF GALL-BLADDER.

(No. 1,021, St. Mary's Museum.)

old lady, and leading to death from peritonitis (Fig. 15); and No. 2,809A, from the Hunterian Museum, shows the ulceration of a malignant stricture, causing a fistula between the gall-bladder and colon (Fig. 16).

Stricture of the Gall-bladder and Bile-ducts.

Stricture of the bile-ducts is one of the rarer sequelæ of ulceration, by which it is probably always preceded, except

in those cases dependent on malignant disease, which are considered under another heading.

Though there is no reason why stricture should not be a sequence of typhoid ulceration, such has yet to be proved,



FIG. 16.—CANCER OF GALL-BLADDER
ULCERATING INTO COLON.

(No. 2,809A, Royal College of Surgeons
Museum.)



FIG. 17.—STRICTURE OF
COMMON BILE-DUCT.

(No. 2,804, Royal College
of Surgeons Museum.)

and the only cases concerning which we can glean information have followed on cholelithiasis, or new growth.

Stricture may only render itself evident after the original cause has passed away; as in three cases of stricture of the cystic duct and one of the common duct, where the cause in the shape of gall-stones was removed, and the strictures

which developed had subsequently to be treated; and in another case of stricture of the common duct, where the history of gall-stones was indubitable, though none were found when the abdomen was explored. (Cases 55, 121, 195, and Case 123.)

Notwithstanding the probable frequency of its occurrence, a search through the museum revealed only a single specimen illustrating simple stricture of the bile-ducts, that is in the Hunterian Museum (No. 2,804A), and shows a long stricture of the common duct; but there are many specimens showing stricture the result of new growth, and some representing obliteration of the whole duct (Fig. 17).

Symptoms.—If in the cystic duct, stricture leads to a gradual enlargement of the gall-bladder, which may be quite painless, as in Case 1; almost painless, as in Case 2; or which may give rise to considerable distress, as in Case 10.

If in the common duct, jaundice supervenes, at first being only slight, but ultimately becoming severe, and being associated with all the usual distressing and dangerous symptoms of chronic icterus, as shown in Cases 3 and 143. The liver enlarges, and may descend to the level of the umbilicus; the gall-bladder may also enlarge, though, if gall-stones have been the cause, the gall-bladder may have become contracted and so be incapable of distension.

Stricture of the hepatic duct is probably extremely rare, for we can only find an account of one case, and that by Dr. Wyeth, who related the history, and showed the specimen from a case of recurrent gall-stone obstruction, in which the gall-bladder was found collapsed and empty at operation, and the patient died unrelieved.

A post-mortem examination revealed a small concretion in the peritoneal cavity, and a stricture of the hepatic duct where the gall-stone had ulcerated its way through.

A form of stricture, not common, may be found in the gall-bladder, converting that ordinarily pear-shaped cavity into the form of an hour-glass.

Among the cases abstracted below were two in which this condition was present. In one, the upper cavity was separated from the lower by an apparently impermeable stricture,

though both cavities contained gall-stones. The upper sac was amputated and the lower drained, after the concretions had been removed.

A specimen in the Middlesex Museum shows the condition very well.

Needless to say, stricture of the bile-passages will scarcely call for diagnosis apart from its cause, though different treatment will be demanded when the disease is recognised at the time of operation. In stricture of the cystic duct the gall-bladder should be removed, as in Cases 2, 22, 65, and 256; otherwise a recurrence of the symptoms will occur when the wound closes, or there will be a permanent mucous fistula, as in Case 1.

As an alternative, the gall-bladder may be short-circuited into the intestine, as in the case reported by Mr. Paul in the *Lancet* for March 24, 1895.

In stricture of the common duct, cholecystenterostomy must be performed, as in Case 13, otherwise a permanent biliary fistula will certainly follow; at times, however, this may be impracticable, and in such cases drainage alone may be feasible.

Perforation of the Gall-bladder and Bile-ducts.

Perforation of the gall-bladder or bile-ducts must always be serious on account of an escape of the visceral contents into the peritoneal cavity, the imminence of the danger, however, depending on two factors: first, the nature of the extravasated fluid; and secondly, the time allowed to elapse before surgical relief is afforded.

The presence of healthy bile in the peritoneum, as might occur from an injury such as a stab, a bullet wound, or a blow in a healthy individual, may be tolerated for some time without serious damage, as in a case recorded by Thiersch, who successfully removed over 40 pints of bile-stained fluid from the abdominal cavity after the gall-bladder had been ruptured by a blow.

The experiments of Schuppel and Bosbrom apparently prove that the peritoneum can absorb extravasated bile without serious trouble, and there have been several cases

reported in which extravasated bile has been successfully evacuated, either by tapping or by incision and drainage.

Such a fortunate result cannot, however, always be looked for, as is shown by the specimens in some of the museums.

No. 2,267 in St. Bartholomew's Museum shows a laceration $\frac{3}{4}$ inch long, in a gall-bladder previously dilated, as the result of a gall-stone lodging at the entrance of the cystic duct (Fig. 18).

The specimen is from a man of fifty, who was kicked when stooping.

No. 2,268 shows a rupture of the fundus of the gall-bladder, caused by a fall on a piece of timber. Bile escaped into the peritoneum, and death followed from peritonitis after five weeks (Fig. 19).

No. 2,268A shows a perforating wound of the gall-bladder from a boy of fifteen, who fell from a load of straw on to a pitchfork. Death occurred after five days, from extravasation of bile and peritonitis (Fig. 20).

No. 1,388 in Guy's Museum is a case of lacerated gall-bladder from a man of twenty-nine, who was kicked in the abdomen, and died on the seventeenth day from peritonitis. The laceration in the gall-bladder measures $\frac{3}{4}$ inch (Fig. 21).

In all the cases where the history is appended, the fact of the long survival after so serious an accident is notable, and the lesson is manifest, that operation would in each case have given good hopes of success.

The following successful case* of drainage of the gall-bladder, apparently thirty days after rupture, by Dr. Martin of Blackburn, is of extreme interest, and is therefore given at length :

'A boy, aged nine years, was admitted to the Blackburn and East Lancashire Infirmary on November 26, 1897. Four days before admission his abdomen had been run over by a cart weighing 15 cwt. After the injury he was carried, or rather dragged, a quarter of a mile to his home. The medical man who then saw him reported that "he was suffering from shock and pain in the right side of the belly, not specially confined to the liver." Next day his symptoms

* *Lancet*, May 21, 1898.



FIG. 18.

(No. 2,267, St. Bartholomew's Museum.)



FIG. 19.—RUPTURE OF GALL-BLADDER CAUSED BY A FALL, THE ABDOMEN STRIKING A PIECE OF TIMBER.

Bile was extravasated, but the patient survived five weeks before death occurred from peritonitis. (No. 2,268, St. Bartholomew's Museum.)

were distinct abdominal swelling, slight discoloration over the region of the gall-bladder, and a temperature of 101° F. ; there was no vomiting. On the 24th there was retention of urine, and his "bowels were moved, the motion giving marked evidence of blood." On admission to the infirmary the boy looked very ill, and complained of pain in the abdomen, which was slightly distended, but not very tender to the touch. Nothing else was made out by physical examination of the abdomen. His pulse was 100, and his temperature was 98°. His tongue was furred ; there was no sickness. Nothing in the way of local treatment seemed indicated, and milk with lime-water was the only food given. At 10 p.m. the temperature rose to 101·8°. Once during the afternoon there was vomiting of curdled milk. Next morning the abdominal tenderness had almost disappeared, and the boy looked much better. He complained of being hungry. From this time till December 2 (six days), when he was sent home, improvement was very rapid ; in fact, two days before discharge he was found running about the ward during the nurse's absence for a short time. He was discharged as being "well," and was taken home to Accrington by an uncle, who carried him most of the way. The uncle states that in the train the boy complained of feeling ill, and when he was seen the same evening by his former medical attendant he was "complaining of pain in the abdomen and vomiting bilious fluid." The abdomen had become distended again. He remained at home for twenty-one days, and during this time the stools were clay-coloured. He was sick occasionally during this time, and the abdomen remained swollen. On admission to the infirmary for the second time a great change was evident in the boy. He had lost a great deal of flesh ; the abdomen was full of fluid of some kind, but was not tender. The temperature was 98°, and the pulse was 110. The tongue was furred ; there was no jaundice, neither was bile present in the urine ; the stools were clay-coloured. The temperature remained normal during the second twenty-four hours after admission. On the third day the abdomen was opened in the middle line above the umbilicus by an incision 2 inches long. Nearly 5 pints

of fluid escaped. This fluid, which was deeply bile-stained, was in the general peritoneal cavity, and not in any way limited by adhesions. The coils of intestine in the neighbourhood of the liver were matted together with lymph. The gall-bladder was empty and was thought on digital ex-



FIG. 20.—WOUND OF GALL-BLADDER.

Taken from a boy of fifteen, who fell from a load of straw on to a pitchfork. Death from peritonitis on sixth day. (No. 2,268A, St. Bartholomew's Museum.)



FIG. 21.—LACERATION OF GALL-BLADDER, CAUSED BY A KICK IN THE ABDOMEN.

The specimen was taken from a man of twenty-nine, who survived the accident seventeen days. (No. 1,388, Guy's Museum.)

ploration to be adherent to the parietal peritoneum. A drainage-tube was left in the wound, and a bulky dressing was applied. The boy bore the operation well, and there was no rise of temperature afterwards. The dressing was removed on the second day, and found to be soaked with bile-stained fluid. The boy's general condition had improved,

his tongue being moist and his pulse better. The after-history is only remarkable for the rapidity of recovery. The temperature never reached 100°, the discharge became less each day, and the tube was discontinued on the seventh day. The total quantity of fluid absorbed by the dressing would almost equal the first amount removed. Bile was noticed for the first time in the fæces on the third day after the operation. The urine was examined each day for bile, but it was never detected. The daily average quantity of urine was only 20 ounces. The patient was discharged on January 1, 1898, and when seen on March 21 was quite well.'

Rupture of Bile-duct due to Injury.—Mr. Battle has reported the case of a boy, aged six months, who had been run over by a cab. At first there were no definite signs of visceral injury; by the seventh day, however, he was deeply jaundiced, with symptoms of acute peritonitis.

Abdominal section was done on the eighth day, and a large quantity of almost pure bile evacuated, but no injury to the bile apparatus could be detected. He died on the ninth day, and post-mortem the liver and gall-bladder were found intact, but the common bile-duct was found completely torn through.

This is apparently the first recorded case of an operation for such an accident; but in Guy's Museum, No. 1,417, is a specimen from a case of Mr. Bryant's, where there is a laceration of the hepatic duct near its origin, and in which death occurred from peritonitis after a week's illness, 2 pints of bile-stained fluid mixed with blood-clots being found in the peritoneal cavity.

In the *Lancet* for March 12, 1898, Mr. Whipple records a case of cyst in connection with the liver, apparently due to the rupture of a hepatic duct.

The patient was a boy, aged sixteen, who a month before coming under treatment had been kicked in the abdomen by a horse. Immediately after the injury he had a good deal of pain, but not much subsequently. He vomited on the following day; but no record of the character of the vomited matter was kept. A week later there was observed an abdominal swelling which gradually increased in size. On

examination there was found a large tumour about 8 inches in diameter occupying the epigastric, and parts of the hypochondriac, lumbar, and umbilical regions. Fluctuation could be obtained, and the tumour gave a dull note on percussion, but was neither painful nor tender. On opening the abdomen above the umbilicus in the middle line, the tumour presented, and about 2 pints of thin, clear, yellowish fluid were removed by means of a Spencer Wells canula. 'The cyst was found to have extended deeply towards the transverse fissure in one direction, and towards the umbilicus to have separated widely the layers of the suspensory ligament of the liver.' When wiping the cavity, some ochry fibrinous material was removed. The lower part of the abdominal wound was closed, and the cyst wall brought up to the upper part and stitched to the parietes, drainage being effected by a tube and iodoform gauze. The boy made an excellent recovery, and left the hospital within six weeks. At that time the liver dulness was normal.

Examination of the fluid removed from the cyst showed the presence of bile pigment.

Gunshot wounds of the gall-bladder are rare. Courvoisier has mentioned six cases, of which two died within a few hours, a third in six weeks from pyæmia, and a fourth from septicæmia. The case related by Hans Kehr is therefore of considerable interest, as immediate laparotomy, with suture of a bullet wound in the gall-bladder of a man aged thirty, was followed by recovery.

It is of far more serious moment when the extravasated bile is pathological, as it for the most part is where there is distension of the gall-bladder, or any disease of the bile-ducts; for in such cases the bile is infective, and rapidly sets up a diffuse peritonitis, which, unless speedily operated on, ends fatally.

Even in such cases, if the diagnosis be made at once and early operation done, the prognosis is good, as in the case of a commercial traveller aged forty-five, who had suffered from gall-stone seizures for twenty-nine years, and who was seen with Dr. Braithwaite of Leeds (No. 81).

After symptoms of inflammation in the hepatic region

extending over several weeks, he suddenly became worse and showed signs of general peritonitis. The abdomen was opened in the right linea semilunaris, and several pints of bile and pus were evacuated. The peritoneal cavity was washed out, and drainage-tubes passed between the liver and diaphragm, into the right kidney pouch, and downwards towards the pelvis, with the result that the patient recovered, and is now in perfect health.

Mr. Lane has also published a case of rupture of the gall-bladder, where the patient recovered after having a considerable amount of bile free in the peritoneal cavity for five weeks. This case confirms the views previously held, that, where surgeons are dealing with the bile-passages, the entrance of a little bile into the peritoneum need not cause anxiety, if only the bile be healthy, or if not, if it be evacuated early.

One of the most remarkable cases of perforation of the gall-bladder, following typhoid ulceration successfully treated by abdominal section, is reported by Dr. Monier Williams and Mr. Marmaduke Sheild in the *Lancet* for March 2, 1895. The case occurred in a married woman aged thirty-one, who was operated on on the fifty-first day of the disease, when the gall-bladder was found to be rigid, thickened, and of a dark plum colour, with a sharply circular, sloughy ulcer, the size of a threepenny piece, near its neck, the gall-bladder containing about $1\frac{1}{2}$ ounces of thick offensive pus. The abdomen was washed out, the distended intestines were emptied by puncture, and gauze packing with drainage adopted, the result being a complete cure.

In cases of rupture of the gall-bladder from sudden pressure, induced by straining at stool, vomiting, sneezing, efforts in parturition, or even by blows over the hepatic region, there is in all probability in the greater number of such cases a predisposition to rupture, in the shape of thinning by ulceration or by long-continued distension, otherwise the accident would be much more common.

This was probably so in the case reported* by Dr. Willard, and in the one described by Mr. Lane in the *Lancet* for

* Transactions, American Medical Association, 1893.

March, 1894, and certainly was in the following case, which occurred in a middle-aged woman and was reported by Dr. G. P. Biggs in the New York Hospital Reports.

The onset of the fatal seizure was sudden, and accompanied by colicky pains in the upper abdomen, rapidly followed by signs of acute general peritonitis. She died on the fourth day of her illness.

At the autopsy, the abdomen was found to be greatly distended, and full of a dark brown, bile-stained fluid, having a slightly faecal odour, the peritoneum being covered with fibrinous exudation.

Just inside the orifice of the common bile-duct a large gall-stone was impacted, and at the junction of the gall-bladder and cystic duct, a minute oblique perforation was found in the floor of an old ulcer. The cystic, hepatic, and common ducts were all much dilated, the last admitting a cylinder 1 centimetre in diameter.

The muscular wall of the gall-bladder was hypertrophied, and the mucous membrane thickened from chronic inflammation, while near the outlet there was a superficial ulceration.

Predisposition was also present in a case seen with Dr. Solly, of Harrogate, of an aged physician, who had himself been aware of a tumour in the gall-bladder for many years, and which occasionally gave him severe pain, though usually it produced no inconvenience. In his final seizure he developed acute peritonitis and rapidly succumbed.

Dr. Solly discovered a perforation in an old ulcer in the gall-bladder, which must have been present for a long time. Numerous gall-stones were also found in the gall-bladder and cystic duct.

In Case 241, on opening the abdomen, there was found a gall-stone actually partly extruded into the peritoneal cavity, there being no adhesions between the gall-bladder and its surroundings which would in any way have limited the effusion, so that had operation been delayed general peritonitis must have speedily ensued.

Such cases show conclusively that it is folly to permit patients with distended gall-bladders, even though symptoms

be only occasionally present; to go unoperated on. We know of several cases where patients are living in a fools' paradise owing to such unsound advice.

A careful operation in these cases is almost devoid of risk, but rupture is hazardous in the extreme.

Massage in cases of distended gall-bladder we look on as the height of folly, though it has been advised by those who should know better.

Attempts to force impacted calculi onward by pressure are well calculated to rupture the thinned wall of the gall-bladder or bile-ducts, or to cause perforation through the base of an ulcer, leading to extravasation of germ-containing fluid into the general peritoneal cavity, and probably to fatal peritonitis.

In the greater number of cases, perforation occurs slowly, as was the case in an aged woman seen with Dr. Chadwick a few days before her death, where jaundice had been present for five years, and at the autopsy a large gall-stone was found lying in a cavity outside of, but pressing on, the common duct. The adventitious cavity was shut off from the general cavity of the peritoneum by adhesions of the neighbouring viscera.

Specimen No. 1,596, Middlesex Museum, shows a portion of liver with the gall-bladder. In a sac beneath it are a number of calculi which have escaped through a perforation in the gall-bladder, and are lying in a cavity formed by peritoneal adhesions.

Specimen No. 2,830, Royal College of Surgeons Museum, shows a cyst between the hepatic and cystic ducts containing a calculus adherent to both, but communicating with neither duct, though it has evidently perforated one of the channels (Fig. 22).

Gall-stones may perforate the mucous membrane and become encysted in the wall of the ducts, as in a case seen with Dr. Bramwell of Cheltenham. After the removal of several stones from the gall-bladder, three were felt in the common duct, two of which were readily removed by choledochotomy, but the third was buried in the wall of the duct, and could only be extracted through a second incision. (Case No. 261.)

In some cases, as in one reported in the *Lancet* for 1893 by Mr. C. A. Morton, the primary perforation may lead to the formation of a second cavity bounded by plastic lymph, which may again rupture, and lead to a fatal peritonitis. The following is a brief account of the post-mortem appearances in the case referred to, the patient being a woman of sixty:

'The body was well nourished. The abdomen was distended, and, on opening it, much orange-coloured fluid escaped, and general recent adhesive peritonitis was discovered. Just below the liver was a cavity the size of an orange, bounded above by the under surface of the liver, and in front by the thin margin of the liver and the omentum, which had been adherent to it. Below, it was separated from the colon by much thickened tissue. On its inner side lay the omentum, and on its outer side, covered by adhesions, between the liver and adjacent parts, lay the gall-bladder, which opened into the cavity by an aperture which would admit one or two fingers. The wall of the gall-bladder was much thickened, and several stones $\frac{1}{2}$ inch in diameter were found lying in it. Where the omentum had before been adherent to the anterior edge of the liver, forming the anterior wall of the cavity, it had become detached, and thus the bile had escaped into the peritoneum, and set up fatal peritonitis. No doubt at one time the gall-bladder con-



FIG. 22. — ADVENTITIOUS SAC CONTAINING GALL-STONE, SITUATED BETWEEN HEPATIC AND CYSTIC DUCTS.

(No. 2,830, Royal College of Surgeons Museum.)

the gall-bladder con-

taining gall-stones had perforated under these surrounding adhesions, and thus the secondary gall-bladder had been formed, which in its turn had finally ruptured into the peritoneum. The gall-bladder was not dilated.'

The perforation may occur into adjoining parenchymatous organs. If reference be made to the list of cases, it will be seen that on several occasions gall-stones have been removed from cavities in the liver produced by ulceration and perforation of the gall-bladder or bile-ducts, and direct passage of the contents into the liver tissue. (Cases 6, 27, and 267 are examples.)

In such cases there are the usual signs of liver abscess following on the ordinary symptoms of gall-stones, which may have been present for years.

If the ulceration and perforation occur from the common duct into the substance of the pancreas, acute pancreatitis may follow; or, without perforation, an infective inflammation may pass from the common bile-duct to the pancreas, as in a case reported* by Dr. Kennan, in which a woman of thirty-eight died of collapse after two days' illness, characterized by epigastric pain, vomiting, and abdominal distension. A post-mortem examination revealed acute pancreatitis, with a large number of stones in the gall-bladder and common bile-duct, one of the concretions protruding into the duodenum.

If the ulceration advance towards the adjoining hollow viscera, stomach, duodenum, or colon, adhesions as a rule form, and the perforation is effected quietly. In one case of this kind, seen with Dr. Stewart, after a history of cholelithiasis, followed by severe stomach symptoms, the gall-stones were vomited, and complete recovery followed.

In several cases we have known large gall-stones to ulcerate their way quietly, and to perforate the intestine, only producing serious symptoms from mechanical intestinal obstruction. These will be considered in detail under the heading of *Fistula and Intestinal Obstruction*.

Rarely gall-stones have perforated into the pelvis of the right kidney, producing symptoms of renal calculus.

* *British Medical Journal*, November 14, 1896.

Not infrequently the perforation may occur after adhesion to the parietal peritoneum, when the events described under simple empyema, of a superficial abscess discharging gall-stones, may follow.

Specimens in the museums show that, although adhesions may have formed, the process of ulceration into a neighbouring cavity is by no means always free from danger of perforation into the general peritoneal sac.

Specimen No. 864 in the Charing Cross Museum shows a gall-bladder-colic fistula, in which there has been a fatal perforation into the peritoneum.

Specimens No. 1,676, King's College Museum, and No. 2,828, Royal College of Surgeons Museum, show gall-bladder duodenal fistulæ, in which death occurred from perforative peritonitis after the gall-stones had passed into the intestine.

There is also another danger, which should by no means be despised, and that is the fear of absorption of toxines, with subsequent septicæmia or pyæmia.

The symptoms of perforation of the bile-passages are those of perforative peritonitis from other causes, but there will usually have been premonitory symptoms pointing to the origin of the disease.

A sudden pain beneath the right ribs, often followed by collapse, and usually succeeded by vomiting, general distension of the abdomen, and a rapid pulse, form the prominent features of the disease.

If the extravasation is extensive, there will be signs of free fluid in the peritoneal cavity.

Jaundice, if not present before the accident, usually comes on from absorption of biliary pigment by the peritoneum, and if the bowels can be moved, the motions will usually be clay-coloured.

If the case be not operated on, death will probably ensue within a few days from toxæmia and paralysis of the bowels, though in some of the cases quoted, life was prolonged into the second or third week.

Treatment.—In these cases medical treatment is useless, and to give opium for the relief of pain so disguises the

symptoms that a fatal sense of security is given for a time, and when the mistake is discovered, it may be too late to operate.

As soon as it is clearly made out that perforation has occurred, or even if it be suspected that such is the case, the abdomen should be opened in the right semilunar line.

If pus and bile be found, they should be rapidly wiped away with gauze or wool sponges, and if the extravasation has gone beyond the local area of disease, the abdomen should be flushed with hot sterilized saline solution.

The patient may be too ill to bear a prolonged operation, and if so, free drainage will probably do all that is necessary.

In draining, it should be borne in mind that the right kidney pouch forms a distinct peritoneal pocket, and that a drainage-tube applied through a stab opening in the right loin affords a free exit for extravasated fluids coming from the neighbourhood of the gall-bladder. If the whole peritoneal cavity has been soiled, a puncture above the pubes large enough for a tube to be passed into Douglas' pouch may be an advantage.

If the patient be in sufficiently good condition to permit a search for the rupture, and it can be found, it may be closed by fine silk or catgut sutures, but as a rule it will be wise to open and drain the gall-bladder at the same time.

Should marked cholecystitis be found, the question of cholecystectomy may be worth considering; but when the patient is in a critical condition, it is a mistake to attempt too much, and, as a rule, cleansing and free drainage will be all that are necessary or advisable at the time, the removal of the cause being left until the patient is better able to bear a prolonged operation.

Fistula of the Gall-bladder and Bile-ducts.

Fistulæ in connection with the bile-passages are by no means uncommon, and their variety is considerable. They result from operation, or from disease, and in the latter case they are due to ulceration resulting from gall-stones or cancer.

The fistulous channel may either be direct or indirect, in the former being caused by an advancing ulcer setting up local peritonitis, and causing adhesion of the gall-bladder or bile-ducts to one of the neighbouring hollow viscera, or to the parietal peritoneum. The extension of the ulcer continuing, a communication is established with the contiguous channel or with the surface. In the indirect variety the perforation occurs first into an adjoining parenchymatous organ or into a localized abscess, and then into an adjacent hollow viscus, or on to the surface of the body at some part.

A fistula may also arise from a local abscess forming outside the biliary passages around the primary focus of inflammation, and then bursting into the adjoining cavities, which are thus made to communicate.

Although the establishment of a fistula is at times dangerous, and at others excessively annoying or uncomfortable, in many cases it forms one of Nature's methods of relief, and the surgeon in forming a permanent biliary fistula in otherwise incurable jaundice, or in making an anastomosis between the bile-passages and the intestine for the like purpose, is taking a leaf from Nature's book.

Many of the fistulæ are mere pathological curiosities, quite undiagnosable, and only capable of being discovered post-mortem. Many must form and heal, leaving the patient cured, and thus not only are they not discovered, but they are probably not even suspected; for, contrary to what one might suppose, fistulæ between the bile-passages and other hollow viscera in the majority of cases heal spontaneously, leaving only visceral adhesions; so that the fistulæ are comparatively rarely found post-mortem.

It will thus be seen that the elaborate figures given by Courvoisier* and Naunyn can only give a very imperfect estimate of the frequency of these fistulæ, which must be constantly overlooked or not recorded.

The authors named examined all the published cases, with the following results:

* *Beitrage zur Pathologie und Chirurgie Gallenwege.*

Fistulæ between the biliary passages themselves ...	...	8
" " " " and the stomach ...	...	12
" " stomach and the liver ...	...	4
" " " " gall-bladder ...	...	8
" " biliary passages and the duodenum	...	108
" " duodenum and the common bile-duct	15	
" " " " gall-bladder ...	93	
" " jejunum " " "		1
" " ileum " " "		1
" " biliary passages and the colon ...	...	50
" " colon and the gall-bladder ...	...	49
" " " " common bile-duct ...	...	1
" " biliary passages and the urinary organs ...	...	6
" " biliary passages and thoracic organs	...	10
" " " " abdominal walls	...	184
" " " " retro-peritoneal tissues ...	...	4
Total ...	...	384

Out of a table of 10,866 autopsies made by Roth, Schröder and Schloth, biliary fistulæ occurred forty-three times :

Between the biliary passages themselves ...	...	...	...	1
" gall-bladder and liver ...	...	...	...	1
" " stomach ...	...	...	...	1
" " duodenum ...	...	...	...	19
" " colon ...	...	...	...	16
" common bile-duct and the duodenum	...	...	...	5
Total ...	...	...	...	43

It would be of greater value if we could give statistics of the number of times that fistula follows operation, but this is seldom mentioned by operators.

The operations tabulated below extend to 274 cases, of which 189 were cholecystotomies, and all are shown in the tables. In 14 cases there were fistulæ following, but as 5 occurred in the first ten operations, since which time the method of procedure has been altered, it is fairer to say that 9 occurred in 179 cases.

Several of the fistulæ were inevitable, as the ducts were strictured; in others they were intentional, as in cancerous obstruction producing jaundice. Where the patients lived,

i.e., where the obstruction was due to simple and not malignant disease, they were all treated by further operative measures, except the first patient, and she says the small mucous fistula gives her so little trouble that it is not worth her loss of time to have it remedied.

Biliary Cutaneous Fistula.—Courvoisier's statistics gathered from reported cases would seem to prove that this is the commonest form of fistula. It may be pathological or post-operative.

(a) **Post-operative fistulæ** may be mucous or biliary.

Mucous fistulæ are occasionally seen after the operation of cholecystotomy, where the obstruction in the cystic duct has not been overcome, or where that duct is the seat of stricture. In Case 1 the patient has had so little inconvenience that she does not think it worth while to undergo any further treatment.

In two other cases of mucous fistula (Cases 22 and 65) dependent on stricture of the cystic duct, the gall-bladder was removed, and this effected a complete and permanent cure.

In another case, where a muco-purulent fistula had been discharging at the umbilicus for some months, the channel was followed up to the gall-bladder, and the cystic duct found occluded by calculi, which were removed, when the fistula closed without difficulty (Case No. 79).

A mucous fistula, as a matter of fact, causes very little inconvenience, as only about 1 ounce of fluid is discharged daily; but if the opening be allowed to close, the accumulation produces pain, and it is therefore necessary for a patient under these circumstances either to wear a small tube and a pad of absorbent wool, or to submit to operation.

The operation of cholecystotomy will not be followed by fistula if the bile-ducts have been cleared, and if the opening in the gall-bladder be sutured to the aponeurosis and not to the skin. Since the operation of cholecystotomy was modified* in this way—which was done after Case 10—no fistula has followed when the bile-ducts have been cleared.

Biliary fistula following on operation is quite a different

* This was first suggested and carried out by the author, May 2, 1889.

matter from mucous fistula, as although in some cases it is compatible with good health, the inconvenience caused by 30 ounces of bile flowing from the fistula daily, produces so much discomfort, that in all the cases which have come under our notice the patients have preferred to accept the risks of operation rather than to retain their disability.

The treatment of biliary fistula should, where possible, be effected by removing the cause ; but, as in certain cases this is impracticable or impossible, other means have to be considered.

If the ducts be clear, and the fistula be small, the application of the actual cautery to the margin of the fistula will frequently result in its closure. That failing, the method adopted in Case 116 may be followed, of opening the abdomen, detaching the gall-bladder and suturing the opening.

Or the less severe method may be first tried, of dissecting the fistula from the skin margin, without opening the peritoneum, afterwards doubling in the mucous edges, suturing them accurately, and over this applying one or two layers of buried sutures before bringing together the skin.

Where, however, the ducts cannot be cleared, and the gall-bladder is large enough to permit of it, the operation of cholecystenterostomy may be performed.

This operation was first performed in a case of biliary fistula (Case No. 13) on January 14, 1888, and the patient is at the present time in excellent health, doing duty as a maternity nurse. Case 121 is another good example.

If the fistula be dependent on gall-stones or fragments in the ducts, the ducts may be syringed through daily with olive-oil, or with a .5 per cent. solution of *sapo animalis*, as recommended by Dr. Brockbank ; or a solution of turpentine in ether may be used, as in Case No. 23.

This is easily done by employing a small flexible catheter, which is passed through the fistula as far as it will go without force. To the end of this a syringe is affixed, and the medicament steadily syringed directly on to the obstruction, the syringing being repeated night and morning for a time.

(b) **Pathological surface fistulæ** usually open at the umbilicus, the abscess following the course of the remains of the um-

bilical vein, as in Case 79, but they may form at any part of the abdominal wall, even near the pubes, or on the left side of the abdomen.

Calculi of various sizes, from a single one 3 inches in diameter reported by Gutteridge,* to multiple small faceted ones, the size of shotcorns, may be discharged in this way, leading to recovery and permanent cure, but until all the calculi are discharged the fistula is liable to remain open.

In operating on these cases, it is advisable to purify the fistula as far as possible, and to scrape away all granulations before opening the peritoneal cavity to get at and clear the bile-ducts. By adopting these precautions no untoward results are likely to occur.

Biliary intestinal fistulæ, as might be expected from the contiguity of the gall-bladder to the duodenum and colon, are the most common, and, as a rule, they are due to ulceration produced by gall-stones. Usually the ulceration proceeds quietly, and produces very few symptoms, until, it may be, the gall-stone sets up obstruction in its passage down the intestinal canal.

But the process is not always accomplished without symptoms, such as pain over the liver, more or less jaundice, and fever of an irregular type, to be subsequently followed by signs of more or less complete obstruction of the bowel.

Hæmorrhage into the stomach or intestines may occur in these cases.

If the fistula is between the gall-bladder and duodenum, 'the most common variety,' the whole length of the intestinal canal has to be traversed by the concretions; hence such cases are found to be more frequently associated with obstruction than when the fistula is between the gall-bladder and colon, for in the latter case the passage to the anus is accomplished without difficulty, though occasionally the concretions may lodge and cause trouble.

When a gall-stone is impacted in the common duct just before entering the duodenum, ulceration and perforation of the duct are apt to occur, the concretion thus escaping into

* *Lancet*, 1878, vol. i., p 851.

the duodenum by an enlargement of the ostium of the common bile-duct from ulceration or sloughing.

Roth, who has paid special attention to this condition, found it five times in twenty-five cases of biliary fistula.

These gall-stones are usually smaller than those causing gall-bladder intestinal fistula, are seldom larger than filberts, and do not often cause intestinal trouble.



FIG. 23.—GALL-STONE IN ACT OF EXTRUSION INTO DUODENUM, THE EDGES OF THE OPENING BEING ULCERATED.

(No. 2,826, Royal College of Surgeons Museum.)

Nearly all the museums have in them examples of gall-bladder duodenal fistula. Specimens Nos. 2,827 and 2,828 in the College of Surgeons Museum are good examples.

No. 2,826 shows a gall-stone in the act of extrusion, and it will be seen that the margins of the opening are ulcerating to allow of the passage. Death occurred after six weeks of suffering (Fig. 23).

No. 1,399 in Guy's Museum is a specimen of Dr. Hale White's, showing a gall-bladder duodenal fistula 1 inch from the pylorus, large enough to admit the finger; and 33 inches

above the ileo-cæcal valve is a large gall-stone impacted in the ileum.

Nos. 2,261 and 2,262 in St. Bartholomew's Museum show gall-bladder duodenal fistulæ.



FIG. 24.—A PORTION OF LIVER WITH GALL-BLADDER, AND A PIECE OF THE TRANSVERSE COLON.

The gall-bladder is much elongated and narrowed; its fundus is adherent to the transverse colon, and communicates with it by a circular orifice. (No. 1,589, Middlesex Museum.)

No. 1,676 in King's College Museum shows a gall-bladder duodenal fistula. Death occurred from peritonitis, though the gall-stone had passed *per anum*.

No. 1,595 in the Middlesex Museum shows a gall-bladder duodenal fistula, through which gall-stones passed. Death occurred from intestinal obstruction.

Gall-bladder colic fistulæ are less common in the museums, probably because they do not often cause death. There are, however, a sufficient number of examples to show that even this method of discharging gall-stones is not altogether safe.

Specimen No. 2,809A in the Royal College of Surgeons Museum is an example of gall-bladder colic fistula caused by carcinoma (Fig. 16, p. 65).

No. 1,589 in the Middlesex Museum shows a gall-bladder colic fistula from a woman of sixty. Death occurred from cancer of the uterus, though five months previously she had violent abdominal pain accompanied by retching, indicating the time the fistula formed (Fig. 24).

No. 864 in the Charing Cross Museum shows a gall-bladder colic fistula, with secondary perforation, and death from peritonitis.

Biliary-gastric fistula is less common than might be thought, for the pylorus is not infrequently adherent to the gall-bladder. At p. 78 a case of this nature is noted in which the vomiting of gall-stones made the diagnosis probable, though the complete recovery of the patient, a woman of fifty, rendered it impossible to be absolutely certain that the surmise was correct.

A second case (No. 219) is of great interest, as, besides the symptoms of recurring pain depending on gall-stones, the patient, a lady aged sixty, suffered from constant dyspepsia, with frequent vomiting, and steady loss of flesh. At the operation the stomach was found firmly adherent to the gall-bladder, and on separating the adhesions a fistula between the gall-bladder and stomach was found. The edges of the ulcer in the stomach were pared, and the opening closed with two rows of sutures; while the opening in the gall-bladder was utilized to remove the gall-stones through and afterwards to allow drainage. The patient made an excellent recovery, and is now in good health.

The Middlesex Museum has a specimen of gall-bladder stomach fistula. (No. 1,595.)

Murchison was of opinion that all vomited gall-stones must have entered the stomach through a fistula.

In one case, Jeaffreson* found such a fistula post-mortem, a gall-stone having been vomited some time before. Mr. Page's case, previously referred to, is an example.

No. 1,706¹, King's College Museum, is a specimen from a case which died seven to eight weeks after gall-stones were

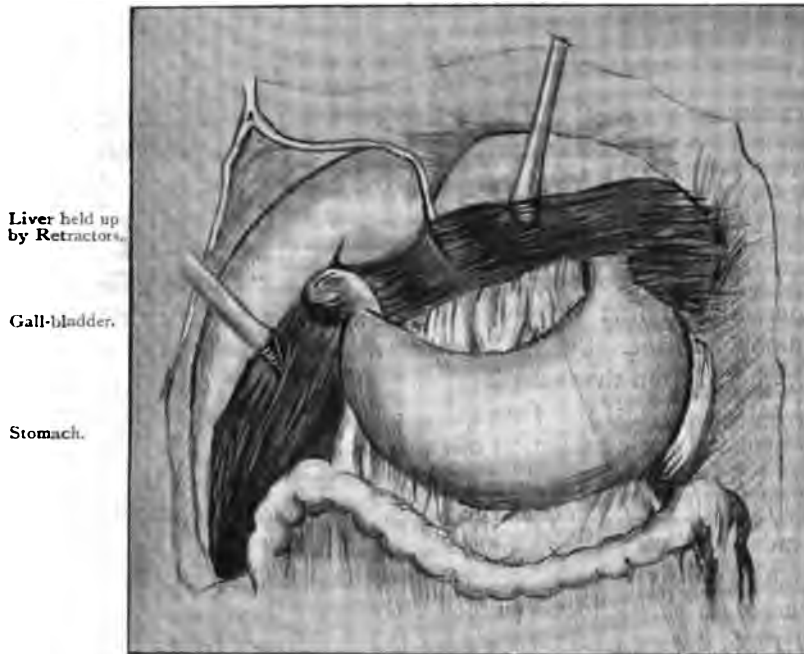


FIG. 25.—ADHESION OF GALL-BLADDER TO STOMACH, LEADING TO DILATATION OF STOMACH AND SPASMODIC PAIN.

removed from the pleural cavity by Professor Rcse, but no communication was found after death between the gall-bladder and pleura.

Of the rarer forms—biliary urinary, biliary vaginal, biliary thoracic, biliary pulmonary, biliary pericardial, biliary mediastinal, biliary pleural, biliary retro-peritoneal, biliary portal, hepato-gastric—we have no experience, and can only refer to cases collected by Courvoisier, Naunyn, Murchison, etc.

* *British Medical Journal*, May 30, 1868.

CHAPTER III.

INTESTINAL OBSTRUCTION.

INTESTINAL obstruction from gall-stones is such a distinct complication of cholelithiasis, calling for special treatment, that it will not be beyond our province to consider it ; and as the chief variety of obstruction is necessarily associated with fistula, it seems convenient to consider it here.

So much has been written about obstruction from gall-stones, that at first sight it might seem to be a somewhat common ailment. Such, however, is not the case, as may be gathered from the fact that on inquiring of the registrars and pathologists, it was found that only four such cases had been treated during a period of twelve months in some of the largest hospitals in the kingdom, representing eighty thousand in-patients, and several hundred thousand out-patients attended to during the same time.

Again, only one case, according to Dr. Brockbank, had occurred in the Manchester Royal Infirmary, between 1883 and 1896, during which time fifty thousand in-patients had been treated.

There are clearly four classes of obstruction of the intestines depending primarily on gall-stones, though by intestinal obstructions from gall-stones is usually understood the impaction of a large concretion in some part of the intestinal tract, producing a mechanical block.

The varieties are :

First, obstruction dependent on local peritonitis in the gall-bladder region, leading to paralysis of the intestine.

Second, obstruction due to volvulus, dependent on the violence of the colic caused by a gall-stone attack, or induced

by the passage of a large concretion down the intestinal canal.

Third, obstruction depending on adhesions left after local peritonitis in the gall-bladder region, or on stricture due to the healing of a fistulous opening between the gall-bladder and intestine.

Fourth, obstruction depending on the mechanical blockage and injury to the bowel produced by the passage of a large gall-stone along the intestinal canal.

In the **first variety** the symptoms may be so severe as to resemble strangulation by a band or acute intussusception. The diagnosis will not, as a rule, be difficult, as the history of the occurrence of previous attacks of spasms, though not of necessity followed by jaundice, the similarity to these of the commencement of the attack in question, the severe and persistent pain, at first localized to the right side of the abdomen, the absence of distension at the commencement, and then the occurrence of distension on the right side only, becoming general later, the lateness of the onset of fæcal vomiting, and only after continued retching, the existence of collapse at an early stage owing to the severity of the pain, which is usually relieved by a morphia injection, the usual absence of visible peristalsis, and, lastly, the onset of jaundice, if the concretions have reached the common duct, afford so much guidance that error will not often occur, especially if the patient be a woman of middle or old age. But that difficulties may arise is shown by the cases about to be mentioned.

Many cases of this kind are seen, but it will be necessary here only to mention three, as showing the difficulty in diagnosis and the extreme urgency of the symptoms.

Case 1.—The patient, Mrs. —, æt. 60, was sent by her medical adviser, Dr. H., into a surgical home in Leeds for immediate operation for acute intestinal obstruction, fæcal vomiting having been present for three days, and medical treatment having failed to give relief.

On arrival she was too exhausted and ill to bear operation, and morphia was administered to relieve her distress and combat the collapse due to the intense pain.

Rectal feeding was at once begun in order to maintain the strength, and ext. bellad. was given every four hours in $\frac{1}{4}$ -grain doses. The patient forthwith began to improve, and a clear history of cholelithiasis was obtained, this attack, the patient said, differing in no respect, except in severity, from those she had frequently had on former occasions. There was marked tenderness over the gall-bladder, particularly at a point one-third of the distance in a straight line between the ninth costal cartilage and the umbilicus, together with some swelling in the right hypochondrium, slight tympanitic distension of the abdomen generally, some jaundice, and the history of a sudden onset followed by two or three slight ague-like attacks. Flatus passed the night of admission, and continued to pass at intervals.

After two days the bowels were freely relieved after a large enema had been administered. No large gall-stone was discovered, but several small concretions, which had evidently passed through the common duct, were found. She returned home in the third week, and has remained well.

Case 2. — Mrs. R., æt. 56, was admitted on July 18, 1893, into the Leeds Infirmary with symptoms of acute intestinal obstruction of three days', and fæcal vomiting of twenty-four hours', duration. The patient was jaundiced and was in very great pain, the pain having begun over the gall-bladder, radiating thence over the abdomen, and through to the right scapular region. She gave the history of having had numerous gall-stone attacks during the previous fifteen years, but she had never been so severely affected as on the present occasion.

A morphia injection, followed by $\frac{1}{4}$ -grain doses of ext. bellad. every four hours, and rectal feeding, soon gave relief to the urgent symptoms, and the bowels were moved on the third day, after which recovery was uninterrupted. On October 21, 1893, the patient having completely recovered from the obstruction, but the spasmodic pain followed by jaundice having recurred, the abdomen was opened, and numerous adhesions of the colon and duodenum to the gall-bladder and bile-ducts were found.

Cholecystotomy was performed, and six stones were

removed, others in the common duct being crushed between the finger and thumb.

The patient was discharged cured in a month, and has been well since. (Case 78.)

Case 3.—A woman, æt. 47, was admitted into the Devon and Exeter Hospital on May 16, 1895, under the care of Mr. A. C. Roper.* She had had no previous serious illness or similar attack. The patient had been suffering great pain in her abdomen, accompanied by vomiting, for three days, and had taken various aperients, resulting in one action of the bowels the previous morning, which, however, did not give her any relief. An enema of 7 pints administered on the night preceding her admission to hospital was returned unstained. Her temperature was 99°, and the pulse 100. She vomited bile and mucus.

Examination of the abdomen showed a visible swelling, freely movable, somewhat tender, elastic, and distinctly resonant to percussion, situated on the right side of the abdomen, extending from just below and 2 inches to the right of the umbilicus up to the margin of the ninth costal cartilage, from which point resistance extended across the abdomen along the line of the transverse colon. The swelling appeared to be like a sausage in shape. A diagnosis of intussusception was arrived at, and under chloroform Mr. Roper made an incision in the middle line. On opening the peritoneum he found a red, inflamed, sausage-shaped tumour which proved to be the gall-bladder greatly distended and elongated, and adherent on its posterior surface to the intestines. Excepting collapse of the large bowel on the distal side of the tumour, nothing abnormal was discovered in the intestines. The gall-bladder was very tense, and no stones could be found in it. It was stitched to the wound and drained. A number of gall-stones were removed seven weeks later, and the patient made a good recovery.

Mr. Lane's case, described under Phlegmonous Cholecystitis, is a good example of this form of obstruction from inflammation starting in the gall-bladder region, though in

* *Lancet*, August 22, 1896.

his case no gall-stones were discovered at the time of operation.

These cases will, as a rule, yield to general and medical treatment, and it will only occasionally be necessary, as in Mr. Roper's and Mr. Lane's cases, to resort to operation during the seizure if the symptoms are not subsiding, though subsequent surgical treatment may be required.

The second variety, volvulus of the small intestine, dependent on the violence of the colic caused by an attack of gall-stones, or on the contortions induced by the passage of a large concretion through the small intestine, is probably uncommon.

The following are abbreviated notes of two cases.

Case 1.—Acute intestinal obstruction in a woman of sixty-eight; operated on November 12, 1890, by laparotomy, on the eighth day of the obstruction, a volvulus of the small intestine being discovered and untwisted. Bowels moved by enema on the sixteenth day after onset of obstruction, and eighth day after operation, and a large gall-stone, 3 inches in circumference and $1\frac{3}{4}$ inches long, was passed, this being manifestly the cause of the obstruction, and secondarily of the volvulus. The patient returned home on the twenty-sixth day, and remained quite well when heard of a year subsequently. (Case No. 30.)

Case 2.—Mrs. O., æt. 62, was found to be suffering from acute obstruction of six, and fæcal vomiting of two, days' duration, the onset having started like a gall-stone attack, with pain over the gall-bladder, and later in the umbilical region. She gave a history of having suffered from attacks of gall-stones for several years, some of which had been followed by jaundice; and from the mode of onset of the present seizure, and the slight jaundice following it, she was quite sure the attack had been one of her old seizures at the commencement. From the persistence of the fæcal vomiting, the presence of visible intestinal peristalsis, and the pinched and anxious countenance, with the absence of relief by ordinary medical means, operation was decided upon. Laparotomy was performed, and volvulus of the small intestine being found, the loop of gut, which was much congested, was untwisted, and the abdomen closed. Flatus passed the

same day, and the bowels were opened the next. The wound healed by first intention, and recovery was uninterrupted. (Case No. 80.)

Diagnosis.—In this class of cases (volvulus) a positive diagnosis is probably, for the most part, out of the question, except after the abdomen is opened, as volvulus of the small intestine is an extremely rare event, and we know that a large gall-stone may quietly ulcerate its way into the gut without any preliminary warning, the symptoms only arising when the concretion is passing through the small bowel; but in both cases related, in addition to the signs of acute obstruction, there was a well-marked localized swelling near the umbilicus, becoming hard during the paroxysms, pointing to the site of the obstruction; and in the second case there was not only the previous history of cholelithiasis, but the characteristic onset of a gall-stone attack, followed by acute symptoms.

Treatment.—In this form, operation holds out the only hope of success, as, the obstruction being mechanical, nothing short of remedying the cause can be of use.

The **third class** is characterized by obstruction coming on after the original cause has disappeared, and depends on adhesions left by local peritonitis due to gall-stone attacks, or on narrowing, caused by the healing of a fistulous tract through which a gall-stone has made its way into the intestinal tract.

A good example is afforded by Case 160, where adhesions of the colon to the gall-bladder led to constipation and attacks of partial obstruction, which were entirely cured by an operation in which the adhesions were separated.

In Case 199, though there were no gall-stones, an attack of typhoidal cholecystitis produced adhesions involving the colon, and led to the formation of a band which compressed the bowel and caused obstruction. The patient, Mrs. L. S., æt. 36, was admitted to the Leeds Infirmary with intestinal obstruction of a week's duration, which was relieved by $\frac{1}{4}$ -grain doses of extract of belladonna and the use of enemata. Six months before this seizure she had a severe attack of typhoid fever, which was followed by steadily-increasing

constipation and the discharge of small motions, accompanied by a little blood and mucus. The patient, being so much better under medical treatment, was discharged, but had to be readmitted on account of a return of the obstruction, with which she had been threatened on several occasions during the month she had spent at home under the care of her own medical man.

On admission the abdomen was distended, and there was distinct tenderness in the right hypochondriac region. Though the symptoms were not so acute as when she was in the hospital before, it was decided to open the abdomen in order to discover, and if possible to remove, the cause of the obstruction.

The operation was performed through a median incision, and the transverse colon was found to be contracted along its whole course, to the size of the middle finger. The ascending colon and the small intestine were much distended, and when they were held aside two bands were found passing from the gall-bladder quite across the hepatic flexure of the colon, one of them completely encircling it. On division of these the cause of the obstruction was removed, and the transverse colon immediately became distended. The abdomen was then closed. The bowels were opened on the day after operation, and before she left the hospital they were opened daily without aperients or artificial help of any kind.

In this case the relation between the fever and the cholecystitis seems to be very clear, and it was probably only owing to the ducts being free that the more serious trouble of phlegmonous cholecystitis did not supervene at the time of the attack of typhoid, for the inflammation of the gall-bladder must have been very severe to have extended to the peritoneal coat, and led to the pouring out of so much lymph as the firm adhesions demonstrated.

Dr. Brockbank refers to a case reported in the Transactions of the Pathological Society of London, 1852, in which there was chronic inflammation and thickening of the ileum and cæcum, with destruction of the ileo-cæcal valve, these being dependent on gall-stones found in the thickened and ulcerated bowel.

The bowel was dilated above the obstruction and much contracted below.

The patient suffered from chronic diarrhœa for three years, which alternated with attacks of obstruction.

The fourth class is the most important variety of obstruction dependent on gall-stones, and is the one furnishing not only the greatest number of cases, but a considerable number of museum specimens. It is dependent on the mechanical obstruction and damage to the bowel produced by the passage of a large concretion through the intestine.

In a paper* read before the Royal Medical and Chirurgical Society in 1894, were related notes of cases illustrating this condition. The following case is quoted *in extenso* from the paper :

‘On September 13, 1894, I received a telegram from Dr. Tempest Anderson and Dr. Raimès, of York, to go prepared to operate on a case of acute intestinal obstruction, but on arrival word was brought to the station that the patient was in a state of collapse, and might be dead on our reaching the house.

‘Fortunately, however, we went, and as a result of a morphia injection administered by Dr. Raimès before our arrival, the pulse had recovered itself, and the patient was a little better. She was a lady of fifty, and gave a characteristic history of gall-stone attacks without jaundice for over ten years, but during the past year she had been much better, until Saturday, September 8, when she was seized with violent pain in the centre of the abdomen of a colicky nature, which was slightly relieved by opium; the pain, however, soon recurred, and was accompanied by vomiting, which became fœcal on Monday, the 10th.

‘Despite morphia and other means, the symptoms persisted, and on Wednesday, the 12th, chloroform was administered, and abdominal massage with abdominal succussion was employed, but without relief.

‘When I saw her at 10.30 on the evening of Thursday, the 13th, her pulse was rapid and intermittent, and she looked extremely ill, though she was temporarily relieved by the

* Paper by Mayo Robson, Trans. Roy. Med. and Chir. Soc., 1894.

morphia which had been given a little time before our arrival.

'There was no distension of the large bowel, but visible coils of small intestine pointed to some obstruction in the lesser gut, and we all agreed that operation was our only course. At 1 a.m. on September 14, the abdomen was opened by a 1½-inch incision below the umbilicus, and almost immediately a hard lump was felt inside a coil of small intestine at the bottom of Douglas's pouch. This loop was brought through the abdominal incision, and surrounded by gauze wrung out of carbolic lotion.

'After emptying the gut by pressure, Dr. Anderson grasped the proximal and distal ends between his fingers and thumbs. I then incised the bowel, and the stone was extruded, the opening in the gut being closed by a continuous catgut suture for mucous membrane, and a continuous silk suture for the serous coat. The surface of the bowel which had been exposed was then bathed with boracic lotion and returned, and the abdominal incision closed in the usual way.

'From beginning to end the operation occupied but twenty minutes, and the patient was put into bed in much better condition than she was before the operation. The wound healed by first intention, and there was nothing to chronicle in the after-progress of the case, the patient being now quite well. The stone weighed 1½ ounces when dry, and measured 3 inches in circumference in one direction, and 4½ inches in circumference lengthwise.'

Mr. Jonathan Hutchinson junior, in 1895, had a successful case of enterotomy for acute intestinal obstruction dependent on a gall-stone impacted in the jejunum, the patient—a woman of sixty—being now well. She had been subject to biliary colic for several years. Her symptoms were very acute, and had persisted for three days. The case was briefly noted in the *Pathological Transactions* for 1895, but has not been elsewhere reported.

Mr. Lund reported a case* in which he had successfully removed a large concretion by enterotomy. The interesting

* *Lancet*, July 11, 1896.

points in this case are that there never had been any previous history of jaundice or colic, nor recollection of feeling of uneasiness in the region of the gall-bladder. The obstruction was caused by a gall-stone fixed in the ileum, and lying near the brim of the pelvis. The measurements of the gall-stone, which was the shape of the gall-bladder, were: Long diameter, $1\frac{5}{8}$ inches; transverse diameter, 1 inch; longitudinal circumference, $4\frac{1}{2}$ inches; transverse, $3\frac{1}{4}$ inches.



FIG. 26.—LARGE GALL-STONE PRODUCING ACUTE INTESTINAL OBSTRUCTION SUCCESSFULLY REMOVED BY ABDOMINAL SECTION.

(No. 2,436A, Royal College of Surgeons Museum.)

Dr. Everley Taylor reported a successful operation in the *Lancet*, and the very large gall-stone removed is in the Hunterian Museum, No. 2,436A (Fig. 26).

It is astonishing how few unsuccessful cases are reported, yet we know that the mortality of these operations has been considerable. The following case,* reported by Dr. Kinneir, of Horsham, is therefore worth noting as an exception.

Mrs. B., aged fifty-seven, was taken with sudden abdominal pain, followed by sickness, on January 14. On the following

* *British Medical Journal*, March 9, 1895.

morning she passed two loose motions. The sickness continued, and stercoraceous vomiting commenced on January 17. Dr. Kinneir was called in to see the patient on January 20 by the family medical attendant, and performed laparotomy on January 21. He found a large gall-stone impacted in the upper part of the ileum, which he removed by enterotomy. After the operation the sickness ceased for some hours; the patient was conscious, expressed relief, and took some nourishment. About six hours later she vomited, but not fæcal matter. This continued at intervals during January 22, and on the morning of January 23 the vomit became again stercoraceous and very offensive. She died on the afternoon of that day. There was no swelling of the abdomen, before or after the operation, and very little pain; the temperature was normal throughout.

Very little urine was passed, and constipation was complete from January 15, in spite of medical treatment. She passed flatus frequently before she died. After the operation she was fed on soda-water, some brandy, and nutrient suppositories. Morphine was injected hypodermically. The gall-stone was covered with a layer of hard fæcal matter. It measured $1\frac{1}{4}$ inches in diameter; its weight was $2\frac{3}{4}$ drachms. On section it presented the usual striated centre, getting darker towards the circumference.

Post-mortem Examination.—The median incision had begun to unite; there was no trace of peritonitis, and no serum or fluid in the cavity. The wound in the intestine was quite unchanged; the small intestine nearly down to the cæcum was distended. There was no other sign of obstruction from the duodenum to the anus. The mesentery, at the seat of the obstruction, and the intestine itself, were of a dark green colour.

The following, among other cases which we could relate, will serve to illustrate the passage of gall-stones without operation, after causing symptoms of intestinal obstruction:

On August 26, 1895, there was seen, with Dr. Lever, of Harrogate, a lady of seventy-three, suffering from acute intestinal obstruction of three days, with fæcal vomiting of twenty-four hours' duration. As there was a previous history

of gall-stone attacks years before, and as the pain of the present attack started over the hepatic region, it was decided to wait and treat the case medically, with the result that a large gall-stone was passed naturally after two days, and the patient made a good recovery.

The following notes are descriptive of a case in the practice of a former Leeds house-surgeon, Dr. Wilkinson, of Anerley Hill :

'My patient is a lady of sixty-three, and the facts are, briefly: an attack of biliary colic, followed by symptoms of acute intestinal obstruction, stercoraceous vomiting, etc. Obstruction lasted three weeks, giving way finally under rest, opium, and copious enemata; and three weeks later a gall-stone was passed *per vias naturales*, about the size of a pigeon's egg, and weighing 5 drachms $41\frac{1}{2}$ grains. There was a well-marked facet on the stone, and the patient had only the faintest tinge of jaundice.'

In the Leeds Museum are stones from a case under the care of the late Mr. McGill, in which the calculi (Fig. 27), four in number, were passed after causing acute obstruction.

In making a study of the reported cases, and especially of museum specimens, one cannot help feeling astonished at finding fatal obstruction depending on quite small concretions, and the comparatively easy passage of very large gall-stones.

For instance, side by side in Guy's Museum are specimens Nos. 1,456, 1,457, 1,458, and 1,459, showing by no means large calculi—one, in fact, only weighing 55 grains—all of which, nevertheless, caused fatal obstruction, and specimens Nos. 1,449, 1,450, and 1,451, showing large stones safely passed *per anum*, though in one case the stone was $3\frac{3}{4}$ inches in circumference, and in another 3 inches long and $1\frac{1}{4}$ inches in diameter.

In a case of Dr. J. Blackburn's the stone, $3\frac{3}{8}$ inches long by $1\frac{1}{2}$ inches broad, actually produced no symptoms except when at the anus. The gall-stone is in the Hunterian Museum, No. 143A.

In the Hunterian Museum, No. 2,436, is shown a beautiful specimen of a gall-stone weighing 400 grains, and measuring

2 inches by $1\frac{1}{4}$ inches, taken from a woman of fifty-two. The fistula between the gall-bladder and duodenum through which it had passed into the bowel is also shown.

In the Middlesex Museum are two of the most perfect



FIG. 27.—LARGE GALL-STONES PRODUCING ACUTE INTESTINAL OBSTRUCTION, PASSED PER ANUM, WITH RECOVERY OF PATIENT.

(No. 317A, Leeds Museum.)



FIG. 28.—LARGE GALL-STONE IMPACTED IN ILEUM, AND PRODUCING FATAL OBSTRUCTION.

(No. 1,493, Middlesex Museum.)

specimens of the kind to be found (Nos. 1,493 and 1,595). No. 1,493 shows a portion of the middle of the ileum (Fig. 28). Impacted in it is a large, almost spherical gallstone, nearly 4 inches in circumference. It has been sawn

in half, and the upper fragment removed. The mucous membrane of the intestine corresponding to this has been destroyed by ulceration. The intestine above the obstruction is dilated. Its peritoneal surface is partly covered with lymph. The gall-stone had passed into the duodenum, through an ulcerated opening between it and the gall-bladder.

The patient was a woman aged forty-six, who died in the hospital, January 31, 1856. Twelve days before her admission on January 29, she was seized with bilious vomiting, to which she was very liable. This lasted two days, when she was attacked by sudden acute pain in the right iliac region, and from this time she had no motion of the bowels, with the exception of some scybala brought away by an enema, till her death. The vomiting continued, and became stercoraceous.

No. 1,595, from the same patient, shows a portion of a liver, with the gall-bladder, stomach, and duodenum.

The fundus of the gall-bladder is adherent to the first part of the duodenum, and a fistulous opening exists between them, through which a glass rod is passed.

The large gall-stone had escaped through the opening.

Schuller (Strasburg, 1891), in reviewing 139 published cases, found that the subjects were women in 74·3 per cent., and out of these 75 per cent. of the cases occurred in women over 50, though instances were found from 18 to 94.

Lobstein* of Heidelberg gives the most common age as between 40 and 60.

It is a curious fact that, although the calculi usually produce intestinal trouble within a few days of reaching the intestine, in some cases they may remain in the bowel for long periods; e.g., in a case† of Mr. Eve's, ten years, and in one‡ of Mr. Smith's, probably fifteen years.

In Courvoisier's elaborate statistics, out of 53 cases examined, he gives the site of obstruction as 21·4 per cent. in the duodenum and jejunum, 65·4 per cent. in the ileum,

* *Annals of Surgery*, January, 1896.

† *Transactions of Clinical Society*, 1895.

‡ *Lancet*, December 3, 1887.

10 per cent. at the ileo-cæcal valve, and 2·4 per cent. in the sigmoid flexure.

Museum specimens amply demonstrate that the gall-stones producing obstruction of the intestine, in nearly every case enter the bowel through a gall-bladder-duodenal fistula. They rarely enter through the colon; only two specimens of the latter condition were found in the London museums, specimen No. 864, Charing Cross Museum, being one.

The disease is a peculiarly fatal one. Out of 280 cases collected by Schuller, Dufort, and Courvoisier, 156 died, *i.e.*, 52 per cent.

Kermisson and Rochard,* out of 105 collected cases, gave the mortality as 50 per cent.

The cases that recovered lasted on the average 8 days, those that died 10 days, but the duration of obstruction may vary from 1 to 28 days.

Lobstein collected 92 cases. Of the 61 not operated on, 32 recovered, the remaining 29 died of peritonitis or exhaustion; of the 31 operated on, 12 recovered; but, as many of the 19 which died were moribund when operated on, their death cannot be charged to operation.

A case reported by Dr. Sargent in the *British Medical Journal*, 1879, actually died, apparently from the intensity of the pain, after symptoms lasting only half an hour.

The following case,† given by Dr. Bradbury, Downing Professor of Medicine in the University of Cambridge, is worth quoting *in extenso* :

‘Case 1 was that of a married clergyman, aged sixty, whom I first saw on February 25, 1895, for slight eczema and an enlarged prostate, which had first manifested itself in the previous November. He had never had jaundice nor passed gall-stones, but was of a gouty habit. During the spring and early summer of 1895 he was less vigorous than usual. Walking was more difficult, and he was easily tired. The urine was normal. I saw him again on June 24, just before he started for the neighbourhood of Whitby for his summer holiday. Soon after his arrival there he began to be troubled

* *Archives Générales de Médecine*, February, 1892.

† *British Medical Journal*, September 25, 1897.

with indigestion and constipation, which he attributed to drinking the peaty water of the place. His bladder did not give him serious trouble till after a long drive in a springless trap, which set up an attack of prostatitis. He was for days in great pain, and afterwards had continuous discomfort, nervous irritation, and sleepless nights. After some time a medical man was called in, who at first attributed the enlargement of the abdomen to constipation, but later on, by using a catheter, he found the bladder considerably distended, and drew off an enormous quantity of water. Cystitis followed, and an attack of phlebitis of the legs (from which he had suffered in previous years), and the ankles became swollen, so that he had to lie up. At the beginning of August he decided to return home, his legs being carefully bandaged. I saw him the evening of his arrival, and found him with a foul tongue, anorexia, and the urine containing pus. He was very weak. The bladder was washed out (Dr. Griffiths seeing him with me), and he improved, though very slowly.

‘Even at this time, with the plainest invalid food, there were, once or twice, little disturbances of digestion, which it was not easy to account for. But his mouth and tongue, which had been terribly dry for weeks, got better at last, and he began to enjoy his food. He was up for the greater part of the day; all seemed to be going on well, and I left him with Dr. Griffiths, starting for my holiday on September 9, 1895.

‘On September 12 he took his first turn round the garden, had dinner downstairs, and seemed particularly bright and well. When he got into bed he had a most terrible rigor, the only one he ever had. At the same time, when using the catheter much pus came away, as if an abscess had broken. Dr. Griffiths was afraid another abscess might form, but this did not occur. The temperature went down, and more food and quinine were given. This treatment, however, failed; he was suddenly sick, and on September 24 felt pressure and pain below the liver, where Dr. Griffiths felt a localized enlargement, which afterwards disappeared. The pain gradually moved higher up, and

with poulticing became concentrated more and more in one place, which was extremely tender to the slightest touch. The temperature kept at from 101° to 102° F., and he had profuse sweats.

'In this condition I found him on returning from my holiday on September 27. The liver was enlarged, but there was no lump to be felt. He was so terribly weak that I at once ordered him champagne, though he had not, in consequence of his bladder trouble, had any stimulants for months. He revived astonishingly, so much so that when, on the following day, four of us—Sir George Humphry, the patient's son-in-law (who is a medical man), Dr. Griffiths, and myself—saw him in consultation to decide if an operation were advisable, the swelling and pain were gone, and the temperature was down to $96\cdot8^{\circ}$ F. More food and stimulants were now given, and with better success; but on October 9, without any apparent reason, the liver again swelled, and the temperature went up to $100\cdot8^{\circ}$ F. This condition soon passed off, and the temperature now kept closer to normal than it had done all along. On two occasions, however, it suddenly went up and as suddenly fell again, but as in other respects he seemed to be going on well, we ceased to trouble about it.

'He was thoroughly enjoying his recovery, was downstairs again, and even taking little walks. On Monday, November 11, he extended his walk before luncheon a little; in the afternoon saw some callers, said good-bye to them in the hall, and was going down a step or two into his study, when he felt a sudden weakness come over him. (Probably at this moment the gall-stone slipped into the bowel.) Later in the day he felt better again, tried to eat his food, and to go downstairs next day. But violent pain drove him to bed, terrible sickness came on, the vomit being almost pure bile, and this continued till his death on November 21. No medicines seemed to have any effect. On the Sunday afternoon the vomit altered slightly in colour; on the Monday it was decidedly dark, and the smell very bad, slightly fæculent. Dr. MacAlister saw him with me that evening, and it was decided to wash out his stomach. This, however, was not

done, as the patient became so very weak. Opium pills were prescribed by Sir George Humphry, who saw him again, and these quieted him, but the sickness did not stop, and on Thursday, November 21, failure of the heart ended his sufferings.

'At the post-mortem examination a gall-stone was found impacted in the jejunum, which had escaped from the gall-bladder through a large opening—about 1 inch in diameter—into the first portion of the duodenum. No abscess was found in the liver, nor any pus in the neighbourhood of the gall-bladder. The stone was about $1\frac{1}{2}$ inches in diameter, and nearly spherical. The prostate was enlarged, and the urinary bladder inflamed and sacculated. The heart was thin and flabby, and the kidneys were cirrhotic.'

As more than one large concretion may be present in the gut at the same time, the symptoms of obstruction may recur once, twice, or three times after the first concretion has been parted with.

Dr. Maclagan* has described two cases of this kind, and Mr. Clutton† has described another, in which he operated successfully within twenty-four hours of the onset of the second seizure, and manipulated the stone through the ileo-cæcal valve.

Symptoms.—The symptoms are those of acute intestinal obstruction from other causes, with early fæcal vomiting and severe abdominal pain. The higher in the gut the impaction, the more violent as a rule will be the symptoms. The obstruction can only very rarely be felt through the abdominal walls.

Although it is sometimes possible, as in Case 99, to make a probable diagnosis from the history of previous gall-stone attacks extending over several years, yet in many cases there is absolutely no previous history to guide one, and it is quite impossible to say whether or not the attack is one dependent on the cause in question, or on a volvulus or band, or internal hernia, which, if left, must inevitably lead to death, and that speedily. The age and sex, together with the history of

* Transactions of Clinical Society, vol. xxi., p. 87.

† *Ibid.*, p. 79.

chronic dyspepsia and pain in the hepatic region, are, however, well worth bearing in mind, as well as the early and persistent vomiting and visible peristalsis limited to the small intestines.

Treatment.—If the diagnosis could always be made with certainty, this is a condition in which medical and expectant treatment might be fairly given a trial, since we have ample evidence of large gall-stones having safely passed without other treatment.

But we must not forget that 52 per cent. of cases treated on medical and expectant lines are fatal, and although surgery has not yet shown a much greater percentage of recoveries, it is because surgical means are frequently only resorted to when the case is hopeless, and after all other means have been tried.

When it is borne in mind that there are no symptoms peculiar to this form of obstruction, and that the course pursued by an obstruction by a band or by an internal hernia may be exactly the same as in gall-stone obstruction, the surgeon who waits beyond the period when an operation may be undertaken with every hope of success is incurring a very serious responsibility.

With regard to the method of treatment after the abdomen is opened and the cause found: if the gall-stone can be easily crushed through the intestinal coats, without too much force being required, so much the better; but that failing, enterotomy, either at or above the seat of impaction, and removal of the stone, should be performed, as it can be done very quickly and with very little damage to the bowel.

Should the patient be too ill to bear a search being made for the obstruction, enterostomy, or perhaps short-circuiting, might be performed, in order to give temporary relief, the cause of the obstruction being afterwards removed, if this be not effected naturally.

As to *when* operation should be done, that is part of a general question, which each surgeon will have to answer for himself in every individual case, as no definite rule can possibly be formulated which will apply to all cases. The

surgeon will, as a rule, not be called in before decided symptoms of intestinal obstruction have manifested themselves, and until medical means have been fully tried. In such cases it would seem to me to be idle waste of time to delay surgical intervention until the patient is so exhausted that operation is only undertaken as a *dernier ressort*, when the subject is almost moribund. If, however, the case be seen at an earlier stage, morphia will have to be given to relieve the pain, and it will be well to recommend ext. bella-donnæ in $\frac{1}{4}$ -grain doses every four hours, the stoppage of all feeding by the mouth, and the administration of one or more large siphon enemas, given slowly with the buttocks elevated. If relief does not speedily follow, and the diagnosis is not clear, chloroform anæsthesia may assist in two ways: in the first place, it enables a thorough examination of the abdomen, and at times a diagnosis of the cause, to be made; and, secondly, the manipulation, if made methodically, may reduce a hernia or volvulus, or may possibly help onwards an obstruction. This failing, and the symptoms persisting, resort to operation should not be delayed, and at this comparatively early stage there will be every prospect of success.

CASES OF INTESTINAL OBSTRUCTION.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History	With whom seen.
30	12-11-90	H. E. 68 F.	Laparotomy	Gall-stone producing volvulus; laparotomy and untwisting volvulus, large gall-stone 1½ in. x 1 in. afterwards passed per anum	R.	Heard of as well and healthy a year after	Dr. Hamilton, Crowle
81	-12-93	P. 49 M.	Laparotomy, lavage and drainage	After symptoms of gall-stones for 29 years, acute general peritonitis starting over gall-bladder. Rupture of bile-ducts and extravasation of several pints of bile, with pus, found at operation	"	Perfect recovery. Patient well and at business within 2 months	Dr. Braithwaite, Leeds
88	13-3-94	M. O. 60 F.	Laparotomy	Acute intestinal obstruction; volvulus after gall-stones seizure. Gall-stone attacks for 7 years. Acute obstruction 5 days	"	Complete recovery after untwisting volvulus. Perfectly well when heard of in June, 1894	Dr. Lownds, Don- caster
99	13-9-94	L. F.	Laparotomy	Acute intestinal obstruction 5 days; large gall-stone found in ileum, removed by incising intestine	"	Complete recovery. Patient well 1896	Dr. Raimes and Dr. Anderson, York
160	24-12-96	C. 42 F.	Exploratory, and separation of adhesions	Spasmodic pain resembling gall-stones. Operation: Abdominal section and separation of adhesions of gall-bladder to stomach and colon	"	Recovery. No pain since operation reported in February, 1897	Dr. H. J. Robson, Leeds
199	18-11-97	L. S. 35 F.	Laparotomy	Typhoidal cholecystitis in March and April, 1897. Intestinal obstruction November, 1897. Operation: Division of band stretching from liver to colon and omentum, and compressing hepatic flexure of colon	"	Complete recovery	Dr. Crawford, Ingrow

CHAPTER IV.

TUMOURS OF THE GALL-BLADDER AND BILE-DUCTS.

IF by tumour be understood new growth, then tumours of the gall-bladder and bile-ducts are not common; but if we accept the usual interpretation of the term, and include all enlargements as tumours, we shall find them by no means rare.

The subject will be considered under the following classification, which appears to include all the chief varieties :

I. TUMOURS OF THE GALL-BLADDER.

(A) Distension of the Gall-bladder.

(a) Distension with bile.

(b) „ „ concretions.

(c) „ „ pus (empyema).

(d) „ „ mucus (hydrops).

(e) „ „ hydatid cysts.

(B) New growths.

(a) Simple.

(b) Malignant.

II. TUMOURS OF THE BILE-DUCTS.

(A) Distension.

(B) New growths.

I. TUMOURS OF THE GALL-BLADDER.

Distension of the Gall-bladder.

A tumour of the gall-bladder through distension with bile is not common, though it is sometimes described as an accompaniment of a gall-stone attack, where the concretion

is impacted in the common duct ; even in such a case it is usually a symptom of short duration, since, if the impaction be complete, the bile speedily becomes absorbed, and gives place to distension by mucus.

A perceptible tumour formed by distension with gall-stones is also rare, unless it happens that some have become impacted in the cystic duct, when a gradual enlargement



FIG. 29.—LARGE SINGLE CALCULUS FILLING THE GALL-BLADDER.

(No. 2,819, Hunterian Museum.)



FIG. 30.—CALCIFICATION OF GALL-BLADDER.

(No. 2808A, Royal College of Surgeons Museum.)

from the retained mucus will follow. As many as 720 gall-stones were removed from the gall-bladder in Case 107, and yet that gall-bladder could not be felt as a distinct tumour. Occasionally a large single gall-stone may form a hard perceptible swelling below the liver, as in Case 252, but such is very rare (Fig. 29).

Calcified gall-bladder, which is due to cholelithic catarrh, may lead to the formation of a hard, rounded, painless

tumour, and this is evidently not very uncommon, if we may judge of its frequency by specimens in the museums (Fig. 30).

Specimens Nos. 2,808 and 2,808A in the Royal College of



FIG. 31. — CONTRACTED GALL-BLADDER WITH HYPERTROPHY OF WALLS, DUE TO GALL-STONE IRRITATION.

(No. 2,807, Royal College of Surgeons Museum.)



FIG. 32. — HYPERTROPHY AND DILATATION OF GALL-BLADDER, WITH POUCHES FORMED BY THE MUCOUS MEMBRANE BULGING BETWEEN THE MUSCULAR FASCICULI.

(No. 2,804, Royal College of Surgeons Museum.)

Surgeons Museum are good examples, as also are No. 1,402 in Guy's, and No. 1,590 in the Middlesex Museums.

The last specimen is interesting in that it was removed from a woman of nearly seventy, and contained bile and one concretion.

Hydrops and **dropsy of the gall-bladder** are terms used to denote distension of the gall-bladder by mucus. It may result from any obstruction in the cystic or common ducts, whether due to gall-stones, stricture, or growth in the ducts, or to cancer of the head of the pancreas, provided that the gall-bladder has not atrophied as the result of previous gall-stone irritation. It is due to the gradual accumulation of the natural secretion of the mucous lining, and may attain such a size as to be mistaken for an ovarian cyst, as in cases reported by Mr. Lawson Tait and by Professor Kocher, though it is uncommon to find the tumour of greater size than 15 to 20 ounces capacity. Mr. Waring* mentions a specimen of enormously distended gall-bladder in the St. Bartholomew's Museum in which the lower end had passed through the right femoral ring and formed the contents of the sac of a femoral hernia, and which was first discovered at the operation. Not only may the cavity be dilated, but its walls may be enormously hypertrophied, so as to form a distinct tumour, as in specimens Nos. 2,804 and 2,807 in the Hunterian Museum (Figs. 31 and 32).

As an extremely rare event, the walls of the gall-bladder may form an adipose tumour, as in a specimen from Guy's Museum, No. 1,403, the walls of the gall-bladder, infiltrated with fat, being $\frac{1}{3}$ inch thick. It was removed from a man of sixty-six suffering from kidney disease and cirrhosis of the liver.

Specimen No. 1,416, Guy's Museum, shows a distended gall-bladder containing colourless mucus, and at the post-mortem no obstruction was found in the ducts. The patient died from pyæmia after acute necrosis.

Specimen No. 1,587, Middlesex Museum, shows an enormously dilated gall-bladder, the result of impaction of a gall-stone at the neck of the gall-bladder.

Specimen No. 2,814, Royal College of Surgeons Museum, shows a large gall-bladder with a gall-stone impacted in the cystic duct (Fig. 33).

If the obstruction be associated with inflammation, the contents of the gall-bladder may become purulent, and an

* 'Diseases of Liver and Gall-bladder.'

empyema of the gall-bladder result, the symptoms and complications of which have already been considered.

Hydatid of the Gall-bladder.—Mr. Page of Newcastle describes a case* of hydatid of the gall-bladder in a man between fifty and sixty years of age, who, until within five years of coming under Mr. Page's care in December, 1897, had been in good

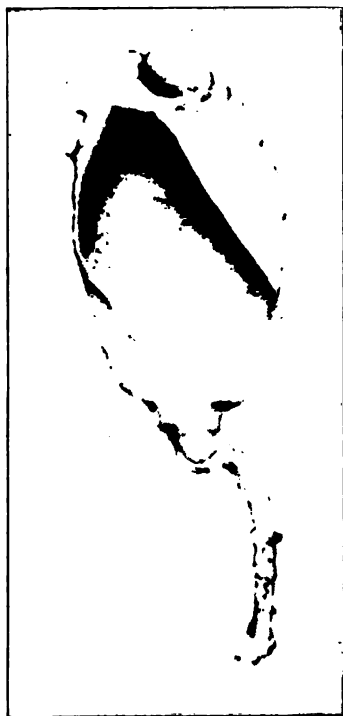


FIG. 33.—DISTENDED GALL-BLADDER AND POUCH AT FUNDUS, CAUSED BY CALCULUS OBSTRUCTING CYSTIC DUCT.

(No. 2,814, Royal College of Surgeons Museum.)

health. During that period he had suffered from occasional attacks of pain in the epigastric region accompanied by vomiting; for eight months the attacks had become more severe, and occurred more frequently. About October he began to lose flesh, and the pain and vomiting were almost

* *Lancet*, April 9, 1898.

continuously present. On November 24 there was first found a tumour of some size, connected with the under surface of the liver, which was supposed to be a distended gall-bladder. On December 9, 1897, the abdomen was opened in the right semilunar line, and the gall-bladder exposed. Some 12 ounces of clear, colourless fluid were drawn off by aspiration, and a search made for a stone in the cystic duct; but none was found. The gall-bladder was incised and a collapsed hydatid cyst at once protruded. This was removed, but not in one piece. No bile escaped. The margin of the incision into the gall-bladder was then sutured to the skin, and the abdominal wound closed. For eleven days the temperature continued to be normal, and all went well—a good deal of clear fluid escaping from the gall-bladder quite unstained by bile. On the 23rd the temperature rose to 102° F., and there was an unpleasant smell about the dressings. On examining the sinus into the gall-bladder its orifice was found to be plugged firmly by a piece of decomposed hydatid cyst, upon the removal of which a considerable quantity of bile escaped. From this time till the middle of February bile continued to flow, at first so copiously that it was necessary to change the saturated dressings twice, and sometimes three times, daily. Ultimately the sinus closed, and the patient completely regained health and strength.

‘In this case the gall-bladder was occupied by a single hydatid cyst containing no daughter cysts. A portion of the cyst extending into the cystic duct had evidently not been removed at the time of operation. When this retained portion separated and became lodged in the sinus, bile flowed into and distended the gall-bladder, by this time considerably reduced in size, escaping through the sinus as soon as its plugged orifice was freed.’

Signs.—Enlargements of the gall-bladder may vary from a tumour just perceptible to the touch, to one of such a size as almost to fill the abdomen, though one of greater size than a large pear is exceptional. The same tumour may also vary in size at different times, this variation being frequently found in gall-stone obstruction.

The symptoms of tumour of the gall-bladder depend for

the most part on the cause, and in consequence vary considerably, at times being slight and unimportant, at others both urgent and serious.

The gall-bladder, as a rule, enlarges downward and forward in a line which, drawn from the ninth or tenth costal cartilage, crosses the linea alba a little below the umbilicus, but the position of the tumour varies with the size of the liver. When that organ is of normal size, the neck of the gall-bladder is opposite the ninth costal cartilage, whereas when the liver is enlarged, the gall-bladder will be pushed down, so that the neck of the tumour may be opposite to, or even below, the umbilicus. If uncomplicated, it will have a smooth, rounded, and pear-shaped outline, the larger end being below, quite free, and moveable from side to side, the upper end being fixed and passing under the lower margin of the liver at the fissure of the gall-bladder.

A distinct sulcus between the liver and gall-bladder is nearly always perceptible to the touch, if the warmed flat hand be laid over the right side of the abdomen, and the patient be told to take a deep breath, when the tumour and the liver will descend together and pass under the fingers.

Bimanual palpation will frequently throw additional light on the case, the right hand being placed in front of the abdomen, and the left under the right loin, making gentle pressure forwards.

In other cases, additional information may be obtained by placing the patient in the genu-pectoral position, and passing the right hand round the abdomen from behind, when a tumour of the gall-bladder will rest distinctly on it, and on deep inspiration the tumour can be felt to move just beneath the abdominal walls, the upper surface of the liver also being in this way capable of palpation.

The swelling is, as a rule, far too tense and hard for fluctuation to be elicited, though at times this sign may be obtained when the swelling is less tense.

In some of the larger swellings, a thrill, almost like the hydatid fremitus, may be felt on gently flicking the tumour with the finger-nail. Percussion by no means always elicits dulness co-extensive with the tumour, especially if the sur-

rounding intestines be distended; so that dulness on percussion is a very variable sign, and palpation will be found more reliable.

Inspection of the abdomen with the patient recumbent will at times show the tumour descending on respiration, but this sign is usually only to be observed in thin patients, and in cases uncomplicated by inflammation. When there is inflammation and matting of the adjoining viscera, a fixed swelling may be seen over the right hypochondrium, with dulness on percussion and marked tenderness.

Tenderness on palpation is a variable symptom, depending on the presence or absence of local peritonitis, it being as a rule absent in uncomplicated enlargements of the gall-bladder.

Jaundice may complicate tumours of the gall-bladder, both being dependent on the same cause—a blocking of the common bile-duct. Although not absolutely pathognomonic of malignant disease, the combination should always raise a suspicion of cancer of the head of the pancreas or of the liver or bile-ducts, especially if it be associated with great loss of flesh and strength, and with absence of characteristic gall-stone pain.

We have observed, in a considerable number of cases, distension of the gall-bladder with jaundice to be associated with malignant disease, but much less often the combination of tumour, jaundice and gall-stones. The explanation of this apparent anomaly is that the gall-bladder frequently becomes diminished in size and adherent, as the result of gall-stone irritation, so that when the common duct becomes blocked by a calculus, jaundice occurs without distension of the gall-bladder, which is unable to expand.

If, however, the common duct becomes blocked by gall-stones before the gall-bladder has contracted and formed adhesions, there may be the combination of jaundice and tumour.

If the common duct be blocked by tumour, the gall-bladder, not having been subjected to irritation, and therefore not having become contracted, will at once distend.

Thus, in malignant disease of the head of the pancreas, we

find the usual combination of jaundice with tumour of the gall-bladder.

Gall-bladder tumours usually contain mucus, occasionally pus, rarely bile. In all cases when the cystic duct is obstructed, and inflammation has not followed, mucus alone is present, though when inflammation coexists, pus or muco-pus may be found.

In obstruction of the common duct by gall-stones, the gall-bladder, though usually contracted, may be found distended by bile at first and mucus later; though, as a rule, the swelling subsides more or less rapidly and no tumour persists, the gall-bladder shrinking. When the obstruction becomes absolute, as in malignant diseases of the head of the pancreas, the tumour formed is persistent, and although the block is in the common duct, bile soon ceases to reach the gall-bladder, and the tumour is always found to contain mucus. This occurs on account of the backward pressure preventing the excretion of bile, which, though formed by the liver cells, is immediately taken up by the lymphatics.

Diagnosis.—Tumours of the gall-bladder may have to be diagnosed from :

1. Moveable right kidney.
2. Tumour of the right kidney, or of the supra-renal capsule.
3. Tumour of intestine or fæcal impaction.
4. Tumour of liver.
5. Pyloric tumour.
6. Abnormal projection of liver.

The diagnosis of enlargement of the gall-bladder from moveable right kidney is, as a rule, easy in thin persons; but in those who are stout, or have tense or strong muscular abdominal walls, difficulties may and do arise, which can, however, usually be overcome by examination under an anæsthetic.

They resemble one another in that each forms a moderate-sized, distinctly-defined, rounded and moveable tumour on the right side of the abdomen, which is found to descend on inspiration.

The previous history may throw light on the case, especially

if there have been definite cholelithic attacks or the presence of jaundice.

By inspection of the abdomen a gall-bladder tumour is often apparent, moving rhythmically with the respiratory movements when the patient is recumbent; but a floating kidney can rarely be so detected.

The general outline of the tumour as detected by palpation may afford valuable assistance; thus, in distension of the gall-bladder the tumour formed is pear-shaped, with the apex towards the fissure of the gall-bladder, and its long axis in a line from about the tip of the ninth costal cartilage downwards, forwards, and inwards towards a point a little below the umbilicus. In floating kidney, especially in patients with lax abdominal walls, the tumour may be grasped and its characteristic shape made evident.

Should adhesive peritonitis accompany the gall-bladder condition, there will be tenderness and pain on pressure over the tumour, especially near its apex. These signs are rarely, if ever, present in floating kidney.

The gall-bladder tumour can easily be moved to a limited extent inwards and outwards by manipulation, but under no circumstance can it be depressed into the pelvis. On relieving it of pressure it tends to resume its old position under the liver.

Floating kidney has a generally wider movement, can be depressed into the pelvis, and when relieved of pressure tends to pass towards the right loin, especially when the patient is recumbent.

A valuable diagnostic sign is the sulcus often felt between the lower margin of the liver and the gall-bladder tumour; this can usually be felt when the warm flat hand is placed over the upper part of the swelling and the patient is asked to breathe deeply.

In the case of renal tumour, as well as in moveable kidney, by distending the intestine with gas the kidney will be pressed back into the loin, but the gall-bladder will be pushed up towards the liver and made more prominent. The last test is usually also sufficient to enable a diagnosis to be made between a distended gall-bladder and a tumour of the right

supra-renal body; but this is not always reliable, as in a case* seen with the late Dr. Kebbel, of Flaxton, the application of Ziemssen's test pushed the swelling upwards, and on performing abdominal section, a sarcoma of the supra-renal capsule was found and removed, the explanation being that the colon was fixed below the growth and pushed it up when the bowel was distended with gas.

In tumour of the intestine or of the pylorus, the associated stomach or bowel symptoms are usually sufficient to enable a diagnosis to be made, but when in doubt, distension of the stomach or bowel with gas will help to clear it up, or examination under an anæsthetic will afford assistance.

Tumour of the liver itself, either cancer or hydatid disease, may be almost indistinguishable from one of the gall-bladder, though the presence of nodules in the liver, with the history and other symptoms of malignant disease, will usually be sufficiently distinctive in cancer, while the less localized and more generally fluctuating swelling, together with the longer history and absence of pain or tenderness, will distinguish hydatid tumour.

It should not be forgotten that the right lobe of the liver may have an abnormal projection, either in the site of the gall-bladder or to the right of that position, which may at first be mistaken for an enlarged gall-bladder; but the absence of symptoms, together with careful bimanual palpation, will usually enable a correct diagnosis to be made, and, as Professor Riedel has pointed out, the gall-bladder may frequently be felt apart from the swelling, or at the top of it.

Puncture with an exploring syringe would, of course, give valuable information, but this should not be lightly undertaken, as it is not devoid of risk, death having occurred on more than one occasion as a direct result of this apparently slight operative procedure.

If it is decided to employ an exploring needle, the aspirator should always be used, in order that the tense cyst may be completely emptied, otherwise leakage from the puncture is almost certain to occur. In cases where the abdomen has been opened we have seen a puncture of the tumour by a

* *British Medical Journal*, August 26, 1899.

small exploratory syringe to pour out fluid in a forcible stream, showing what would have occurred had the puncture been made through an unopened abdomen.

In case of doubt, especially where the symptoms demand interference, exploration of the tumour through a small abdominal incision can be undertaken with very little risk, and at the same time further treatment where called for can be carried out.

Of the tumours dependent on new growth, cancer of the gall-bladder is the most important; innocent growth, except of inflammatory origin, being extremely rare; unless it be true, as Zenker (Musser's quotation) suggests, that an adenoma first develops in the gall-bladder and subsequently becomes transformed into an adeno-carcinoma. Dr. Rolleston* has reported a case in which this sequence apparently occurred in the bile-duct of a woman from whom a papilloma was removed, the growth being in immediate contact with a gall-stone. After some months she returned with a growth in the same region, presumably malignant.

Cancer of the gall-bladder is not nearly so uncommon as was once believed, but as a primary affection is somewhat rare. It is usually secondary to gall-stones, or to cancer of adjoining organs, and in the latter case is not amenable to surgical treatment.

Musser collected all the reported cases,† and Dr. Rolleston has published two extremely interesting papers (to which we have been much indebted) on the subject, one in the *Medical Chronicle*‡ and the other in the *Clinical Journal*.§

The tumour may probably be of one of three varieties:

- (a) Columnar-celled carcinoma;
- (b) Spheroidal-celled carcinoma;
- (c) Squamous epithelioma.

The existence of squamous-celled epithelioma in the gall-bladder has been doubted; but the appearances in the case

* *Medical Chronicle*, January, 1896.

† *Boston Medical and Surgical Journal*, December 15, 1889.

‡ *Medical Chronicle*, January, 1896.

§ *Clinical Journal*, April 7, 1897.

described and figured below (p. 130) seem to be conclusive. Dr. Rolleston explains the appearances shown in such cases by saying, 'In transitional parts the epithelial cells may be so far modified as to appear flattened, and have then been described as squamous cells,' and it is possible his explanation is the true one, but the question can scarcely be decided on the evidence at present available. The growth is said usually to begin at the fundus, where the irritation from gall-stones would be most felt; but it may occur first at the neck of the gall-bladder, or may be found as a uniform thickening of the walls of that viscus. In the last case there is often found in the centre of the mass a cavity containing gall-stones; while where the neck of the gall-bladder is the primary seat, it is usual to find a gall-stone impacted just beyond the disease, which would appear to have started as a result of the local irritation (Case 232).

The columnar-celled form may project into the gall-bladder, and fill it with a villous or papillomatous growth.

Specimen No. 2,265 in St. Bartholomew's Museum shows a soft carcinoma in the gall-bladder budding from the mucous membrane in a polypoid form (Fig. 34).

No. 2,266A, St. Bartholomew's, also shows an epitheliomatous papillary growth in the gall-bladder, and secondary cancerous growths in the liver.

No. E 308, Leeds Museum, shows a similar condition (Fig. 35).

No. 2,264, St. Bartholomew's, shows a gall-bladder converted into a mass of medullary cancer, in the centre of which are four faceted gall-stones. The pylorus is adherent. It was taken from a woman of fifty-nine, who suffered from a dilated stomach, but had no serious symptoms until a month before death. She was never jaundiced.

Extension of the growth is usually by continuity, the liver as a rule being first affected by its spread; but the colon very frequently is the organ first attacked when the growth has originated at the fundus of the gall-bladder. Where the tumour arises at the neck, the pylorus, as might be expected from the anatomical relations, is not infrequently soon affected, and there may follow all the symptoms of cancer of the pylorus.



FIG. 34.—CARCINOMA OF GALL-BLADDER.
(No. 2,265, St. Bartholomew's Museum.)



FIG. 35.—CANCER OF GALL-BLADDER INVADING LIVER.
(No. E 308, Leeds Museum.)

Where the gall-bladder becomes attached to any hollow viscus a fistula is apt to form (see p. 80).

The disease may spread along the mucous membrane and affect the ducts, and give rise to obstructive symptoms.

At times, though rarely, the peritoneum becomes infected, and there then rapidly follows ascites, and obstruction of the veins of the lower extremities.

The lymph glands at the hilum are usually affected, but systemic infection is rare.

The very frequent association of cancer of the gall-bladder with gall-stones is an undoubted fact, and in all probability there is a connection between the two diseases.

Zenker* found gall-stones in 85 per cent. of cancers of the gall-bladder, and Musser, from an analysis of 100 cases, gives the proportion associated with gall-stones as 69 per cent., which may, however, be an under-estimate, as it is well known that gall-stones may produce serious irritation, and then pass into the alimentary canal, so that their effects may remain, although the cause may not be discovered. Case 12 is an illustration of this, where, following on symptoms of gall-stones of several years' duration, came a distended gall-bladder, which at the operation was found to be due to cancer of the bile-duct, all the gall-stones having been passed.

Courvoisier found gall-stones present in 74 out of 84 cases of primary cancer of the gall-bladder; Brodowski (Naunyn, p. 153) in 100 per cent.; Jaylè (Soc. Anat., 1893) in 23 out of 30; Bertrand in 14 out of 15; and Siegert in 95 per cent. of primary, but only in 15 or 16 per cent. of secondary, carcinoma of the gall-bladder.

According to Schroeder, 14 per cent. of all cases of gall-stone patients suffer at some time from cancer of the biliary passages, and Naunyn is of opinion that half the cases of chronic jaundice diagnosed as cholelithiasis are complicated with cancer or are due to cancer alone. This latter statement is of extreme importance, since operation in the presence of cancer and chronic jaundice is very fatal.

The two theories which have been current, to explain the

* *Deutsch. Arch. für Klin. Med.*, 1889.

co-existence of gall-stone with cancer of the liver, are: first, the 'irritation' theory, that gall-stones are formed first, and by acting as foreign bodies, set up irritation, which leads to malignant growth; and, second, the 'concentration' theory, that gall-stones arise as a secondary result, from stagnation of bile in the ducts, caused by their obstruction from malignant growth. It is, however, very doubtful whether, apart from a catarrhal condition of the mucous membrane, gall-stones are formed. It should be remembered that the cholesterin in gall-stones is derived, in all probability, not from that present in the normal bile, but from the mucous membrane.

Mr. C. Beadles, in a paper* before the Pathological Society of London, stated that out of 100 post-mortem examinations at the Cancer Hospital, 4 were cases of primary carcinoma of the liver, and all had calculi in the gall-bladder; 36 had secondary carcinomatous growths in the liver, but there were no gall-stones present in any of them. Of 9 cases of primary carcinoma of the liver at Colney Hatch, 5 were males and 4 females, and gall-stones were present in 7, being absent in 1 male and 1 female. These facts support the theory of irritation, as does also the fact that the disease occurs much more frequently in women than in men, and in much the same relative proportion as gall-stones. Musser's cases included 75 females and 23 males; while Siebert found that of 93 cases 79 were in females.

Symptoms and Signs of Cancer.—If the growth be primary, there will be the history of a more or less rapidly growing tumour developing under the right costal margin, accompanied at first by a sense of discomfort, shortly changing to pain, which is often worse at night, and which, though at first localized to the right hypochondrium and epigastrium, usually before great advance has been made, extends round the side to the right infra-scapular region. When the enlargement is first noticed it is felt as an egg-shaped swelling beneath the liver, descending on inspiration. The tumour is hard to the touch, and very slightly or not at all tender to pressure. At a later stage it becomes more fixed

* *Lancet*, March 9, 1895.

and more diffused, and nodules may develop and be felt on its superficial surface. As the growth extends, it invades the liver, and sometimes the duodenum and stomach. Dissemination is rare. When it occurs, nodules may be found in the liver, and generally over the peritoneum. In such cases ascites develops. The lymph glands in the hilum of the liver usually become affected.

According to the invasion or not of the hepatic or common bile-ducts, so will be the presence or absence of marked jaundice; but in nearly half of the cases some degree of icterus will be found as the disease advances, owing to the presence of catarrh of the bile-ducts.

Interference with the action of the bowels, even to partial or complete obstruction, at times occurs. General failure of health, continued wasting with loss of strength, ascites and marked cachexia, characterize the later stages.

Perforation may occur and hasten the end by the onset of general peritonitis. If gall-stones be present there will be the usual antecedent history of cholelithiasis. Where gall-stones with jaundice complicate cancer of the gall-bladder, exacerbations of pain will usually be accompanied by rigors and fever, 'ague-like attacks' with an intensification of the icterus, and in such cases, petechiæ in the skin with hæmorrhage from the nose and rectum generally supervene.

Diagnosis.—Cancer of the gall-bladder may usually be diagnosed by the progressive character of the disease, and by the presence of the characteristic hard tumour; but it is by no means always easy to diagnose cancer from a tumour formed by matted intestines, due to local peritonitis in the neighbourhood of the gall-bladder.

In a doubtful case of this kind, in a woman of fifty, when the abdomen was opened there was found what appeared to be a malignant tumour of the gall-bladder, which was punctured in several places with an exploring syringe. Finding it firm and hard, it was concluded to be malignant, and, as it was too extensive for removal, the abdomen was closed, since it was thought nothing more could be done. The patient, however, forthwith recovered, and is now well, with no remnant of her tumour. It is, of course, impossible

to say that this was not cancer, but in all probability it was an inflammatory swelling associated with gall-stones (Case 46).

In another case of tumour, where there was a suspicion of malignancy, an abscess of the liver containing thirty gall-stones was opened, and this gave marked relief, though only for a time, as death supervened four months later, when malignant disease was found. When in doubt, exploration is probably the best method of settling the question, as at the same time treatment may be carried out, as in Cases 56 and 57.

That cancer of the right supra-renal body may afford a difficulty in diagnosis is shown by the case referred to in the chapter on simple tumours of the gall-bladder. The same difficulty applies to cancer of the pylorus, which, however, is accompanied for the most part by characteristic stomach symptoms.

Treatment.—The alleviation of symptoms, especially of pain by sedatives, is usually all that can be done, except in those rare cases where the disease is limited to the gall-bladder, when cholecystectomy may be performed.

For instance, specimen No. 2,265, Bartholomew's, is taken from a case in which the whole disease could have thus been removed, if it could have been diagnosed (Fig. 34).

In a limited number of cases in which the liver is affected by direct extension from the gall-bladder, it may appear feasible to remove the whole disease. In such it is probably right that the patient should get what chance there is of complete cure, though in all probability, as might be expected, this is but slight. As illustrating the kind of cases suitable for such treatment and the nature of the procedure which may be necessary, the following notes of cases may be useful :

Case 1 (No. 127).—The patient, a woman of fifty-four, gave the history of having had an enlarged gall-bladder for twelve years, which had given no trouble until three years before, from which time she had had gall-stone attacks. For four months she had been failing in health, and when seen, the gall-bladder reached the right groin, and the right lobe of the liver the level of the umbilicus.

She was operated on on November 23, 1895, and on opening the gall-bladder the walls were found infiltrated with growth, and the contents putty-like in consistence. The entrance to the cystic duct was occluded by a growth the size of a walnut, and beyond this a gall-stone could be felt in the cystic duct. As there was a nodule of growth on the under surface of the liver close to the one in the neck of the gall-bladder, the whole mass was pulled forward, and encircled with an elastic ligature, which was passed below

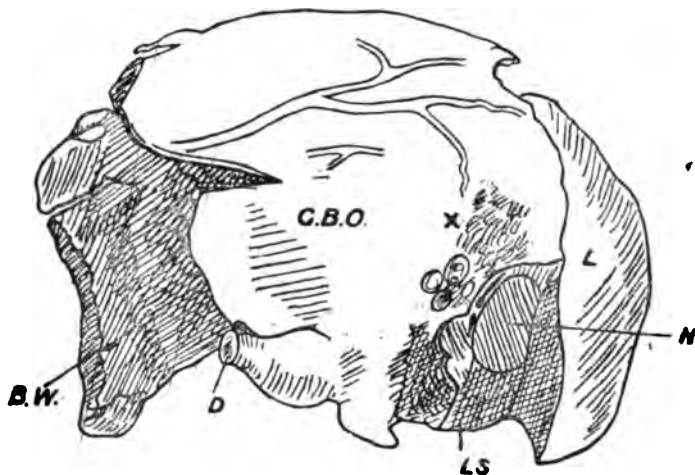


FIG. 36.—EXCISION OF A PORTION OF LIVER FOR TUMOUR (MAYO ROBSON)
(REDUCED ONE-THIRD).

G.B.O., Outer surface of gall-bladder; near x the growth is infiltrating the wall, shown in shaded portion; B.W., thickened and infiltrated wall of gall-bladder, laid open; L, liver; LS, liver laid open to show—N, secondary malignant nodule in liver; D, cystic duct. (*Trans. Roy. Med. and Chir. Soc.*, vol. lxxix.)

the gall-stone so as to get well beyond the growths, retraction being prevented by two knitting-needles pushed through the projecting liver.

The projecting portion was then cut away; it included liver, gall-bladder, and part of the cystic duct, and weighed half a pound. Recovery was uninterrupted, and the temperature never reached 100°. The growth, on examination by Mr. J. W. Haigh, was reported to be epithelioma. The case is fully reported in the seventy-ninth volume of the *Trans. Roy. Med. and Chir. Soc.* (Figs. 36 and 37).

Case 2 (No. 201).—Mrs. H., aged fifty-two, gave a history of repeated severe attacks of pain in right hypochondriac region during twelve months, sometimes followed by jaundice. Preceding this there had been attacks of ‘spasms’ for some considerable time. A month before coming under treatment a swelling was noticed under the right costal margin. The

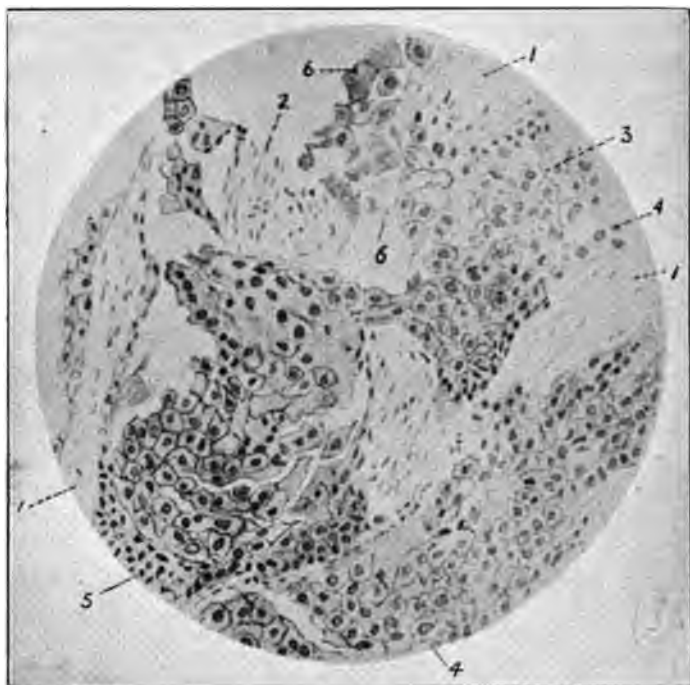


FIG. 37.—MICROSCOPIC SECTION OF THE NEW GROWTH. (HARTNACK OBJ., No. 4, OC. 3 = $\times 120$. DRAWN BY J. W. HAIGH.)

1, 1, 1, Connective tissue of alveolar walls; 2, connective-tissue nuclei; 3, epithelial cells, somewhat squamous in appearance; 4, 4, nuclei of ditto; 5, smaller rapidly-growing cells of basement layer; 6, 6, degenerated epithelial cells in which the nuclei have disappeared.

patient had been losing weight and strength for several months, and was suffering from slight jaundice, which became intensified after each attack of pain, these seizures being followed by a feeling of chilliness with some fever. It was quite easy to make out an enlargement of the right lobe of the liver with a distended gall-bladder on its inner

side. The abdomen was opened through the right semilunar line on November 27, 1897, and the gall-bladder was found enormously distended with putty-like material which had to be removed by a scoop. The gall-bladder also contained four gall-stones. After numerous adhesions had been detached, there was felt an enlargement of the cystic duct, and below this an impacted gall-stone. Closely adjoining the gall-bladder a nodule of cancer was seen in the liver, which was also infiltrated opposite the growth in the cystic duct. The right border of the liver, which projected well below the ribs, and the gall-bladder and cystic duct, were now dragged forward, and a knitting-needle was thrust through the liver and through the cystic duct below the disease, the whole being then encircled by an elastic tourniquet, which was tied and cut off short. The abdomen was then wiped dry, and the rest of the wound closed. The portion of liver, gall-bladder, and cystic duct beyond the ligature were then cut away, and apparently the whole of the disease was removed, as no nodules could be seen on any other part of the liver. The patient made a somewhat tardy recovery, from the persistence of the ague-like attacks which had been associated with the infective cholangitis present before operation.

The needle and tourniquet separated in a fortnight, and after that there was free discharge of bile for a time, giving great relief, and leading to the cessation of the ague-like seizures. The patient regained her flesh and strength, and had a period of good health until March, 1898, when a small nodule was noticed in the skin below the umbilicus, together with some swelling in the inguinal glands. In April there was a little ascites, and from this time her health rapidly failed, and she died from exhaustion in July, 1898. The portion of liver removed weighed 7 ounces, and then did not include the large amount of soft material removed from the gall-bladder. Under the microscope the growth proved to be carcinoma.

Case 3 (No. 208).—Mrs. B., aged fifty-two, was admitted to the Leeds Infirmary in February, 1899, complaining of slight attacks of abdominal pain beginning in the previous September

and being specially severe in December. There had been very rapid loss of flesh, and by the time of her arrival at the hospital she was extremely ill. Icterus was slight, but there was a large, irregular, hard, and fixed tumour beneath the right costal margin, manifest to sight and tender on pressure. At the operation the gall-bladder and cystic duct were found filled with pus, epithelial débris, and gall-stones. The walls of the gall-bladder were infiltrated with growth, which extended into the adjoining part of the liver. The omentum, pylorus, hepatic flexure of the colon and duodenum were all adherent, probably by cancerous infiltration; but, when they had been separated, it was deemed wise to complete the operation, as in the two previous cases, by means of elastic ligature and external treatment of the pedicle. The patient was put back to bed in good condition, and seemed as if she would do well, but in the night she rapidly lost strength, and despite transfusion, injection of strychnine, and the use of other means, she died from shock.

Examination of the parts after death showed that the whole of the disease in the gall-bladder and liver had been removed.

Case 4 (No. 271).—Mr. A. B., aged forty-six, had suffered from attacks of cholelithic colic for five years before coming under observation toward the end of 1897. At that time it was considered that there was a gall-stone in the common duct, and he was advised to submit himself to operation; but, acting on other medical advice, he decided not to do so. By the middle of 1899 he had lost 4 stones in weight, and was extremely weak. Jaundice was present, and there was evidence of infective cholangitis.

At the operation on June 26, 1899, there were found a large number of gall-stones in the common duct, and a tumour of the liver just at the point of attachment of the fundus of the gall-bladder. The mass, which was hard and irregular, was excised partly by the use of the knife and in part with scissors. The bleeding, which was not very severe, was controlled by pressure; only one vessel, an artery, requiring to be ligatured. A sponge was packed into the cavity left, while the gall-stones in the common duct were crushed, and

cholecystenterostomy was performed by means of a Murphy's button. Thereafter the wound in the liver, which measured about 4 inches across, was as far as possible brought together by catgut stitches placed deeply by means of an ordinary round, curved needle, and tied slowly, the remaining part of the cut surface of the liver being packed with iodoform gauze. On the second day a considerable amount of bile escaped along the gauze, and this continued to discharge for ten days, but in gradually diminishing quantity. After this time only serum escaped. The first packing was removed on the fourth day, and thereafter the wound was dressed twice daily for ten days, and once a day from the end of the fortnight till it healed. Sixty-two gall-stones were passed per rectum on the tenth and eleventh day without any pain. The Murphy button came away on the twenty-third day. The patient left the Nursing Home five weeks from the date of operation, and has since been very well. On August 29 he reported that he had gained a stone in weight since the operation. A microscopic examination showed the tumour to be a spheroidal-celled carcinoma.

As in these cases, so in most, the question of operation will usually have to be faced, since the possibility of the trouble being dependent entirely on inflammation, the result of gall-stone irritation, and not on new growth, cannot always be pre-determined. Indeed, even after the abdomen has been opened, it is not always easy to be sure of the exact condition of affairs until adhesions have been broken down. It is not very uncommon to find a gall-bladder containing pus and gall-stones in the centre of a mass of omentum and adherent viscera so hard as very closely to simulate new growth. In such cases, of course, all that is necessary in order to effect a cure is to remove the stones and drain the gall-bladder.

Whether it is worth trying thus to remove a localized cancer of the liver and gall-bladder is a question which can only be solved by more extended experience; but we are inclined to think that in the cases reported above, even when recurrence took place, the respite gained to the patient more than counterbalanced the danger of the operation. In similar cases, where no attempt at radical treatment was made, the

CASES OF HEPATECTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
127	23-11-95	W. 54 F.	Cholecystectomy and hepatectomy	2 gall-stones removed from gall-bladder. Gall-bladder distended and dilated with thick material like putty. Walls infiltrated with malignant disease; cancer in cystic duct. Gall-bladder excised with $\frac{3}{4}$ lb. of liver	R.	Patient improved and remained well till Feb. 27, 1896, when she returned with superficial nodule in abdominal wall, which was excised. She died some months afterwards from recurrence of disease. Case reported Clin. Soc., 1896	Dr. O'Connell, Keighley
201	27-11-97	M.H. 52 F.	Cholecystectomy and hepatectomy	Pain over gall-bladder for $\frac{1}{2}$ year. Tumour noticed for a month. Operation: Cancer of gall-bladder and adjoining part of liver with gall-stones in gall-bladder and cystic duct. All affected parts removed by means of an elastic ligature	R.	Good recovery. Patient out of doors in six weeks. Recurrence of disease April, 1898	Dr. Ruxton, Blackpool
208	17-2-98	J.B. 52 F.	Cholecystectomy and hepatectomy	Attacks of pain in right hypochondrial region commenced in September, 1897, but became especially severe in December. A large tumour present. Operation: Gall-bladder and cystic duct filled with stones. Walls of gall-bladder infiltrated with growth which extended into liver, pylorus and colon. Adhesions detached, gall-bladder and adjoining part of liver removed by elastic tourniquet	D.	Death from shock	Dr. Carter, Richmond

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
234	29-9-98	A. W. 40 F.	Cholecystectomy and hepatectomy	Strong family history of phthisis. In 12 months several attacks of severe pain in right iliac region, accompanied by swelling in normal situation of cæcum, and marked tenderness between anterior superior spine of ilium and umbilicus. Each attack associated with fever, constipation, vomiting, and abdominal swelling, and all signs of local peritonitis over inflamed appendix. Operation: Incision over cæcum; viscera matted together by old and recent lymph. After separating adhesions, gall-bladder reached at end of projecting Riedel's lobe, mucopus and several gall-stones removed. Tumour of cystic duct felt, and as on incision it gave appearance of growth, it, with the gall-bladder and projecting lobe of liver, was removed by means of elastic ligature. Mr. Targett reported the tumour to be inflammatory, and not due to tubercle or cancer	R.	Satisfactory recovery. Quite well some months later	Dr. Nicholson Dobie, Keighley
271	26-6-99	A. B. 46 M.	Hepatectomy and cholecystenteros- tomy	Gall-stone attacks for 7 years. Symptoms of floating stone in common duct, 1897. Infective cholangitis, 1899. Loss of 4 stones in weight. Operation: Tumour of liver found and excised. Number of small stones in common duct crushed. Cholecystenterostomy by Murphy's button	R.	Good recovery. Gained a stone in weight. Dec., 1899, quite well, and of normal weight	Dr. Fisher, Skip- ton

course of events does not seem to have been nearly so satisfactory, for the disease steadily progressed to a fatal termination, and the patients had not even the satisfaction of a respite, or the hope of recovery engendered by the knowledge that the malignant disease had been removed.



FIG. 38.—PAPILLOMATA OF THE GALL-BLADDER.

(No. 1,404, Guy's Museum.)

Sarcoma of the gall-bladder is much less common than carcinoma, but it is occasionally found. Musser* has collected three cases, and Rolleston† reports another, which, on examination, was found to be a case of spindle-celled sarcoma.

In the Hunterian Museum, specimen No. 2,809 shows a melanotic sarcoma of the gall-bladder.

Simple growths in the gall-bladder are not of great clinical importance, except as precursors of malignant disease. The following specimens have been found in the museums :

No. 2,812, Royal College of Surgeons, shows villi and papillæ on the mucous surface of the gall-bladder associated with gall-stones.

No. 1,404, Guy's Museum, shows papillomata in the gall-bladder from a woman of fifty-nine, who died of phthisis. They are sessile towards the fundus, and pedunculated towards the neck of the bladder (Fig. 38).

In the Museum of the Western Infirmary, Glasgow, is a beautiful specimen of adenoma of the fundus of the gall-bladder, which has been described and figured by Dr. L. R. Sutherland.‡

No. 1,405, Guy's Museum, shows a gall-bladder in which the mucous membrane is covered with warty growths.

* *Boston Medical and Surgical Journal*, December 15, 1889.

† *Clinical Journal*, April 7, 1897.

‡ *Glasgow Medical Journal*, September, 1898.

II. TUMOURS OF THE BILE-DUCTS.

Cystic Tumours.—Tumours of the bile-ducts, *per se*, only occasionally form a projection so large as to be distinguished through the abdominal walls. Tumour, however, in such cases is, as a rule, present sooner or later on account of the obstruction in the ducts and secondary distension of the gall-bladder. The common duct has been found dilated to such a size as to form a cystic tumour, presenting all the characteristics of a distended gall-bladder, the gall-bladder itself being atrophied.

Terrier describes four cases in which an external fistulous opening was established in the common bile-duct. In three of these the duct was much distended, and formed a distinct abdominal tumour. The first case was one in which median laparotomy was performed for the removal of a swelling diagnosed as a cyst of the pancreas. The nature of this swelling having been revealed by the discharge of bile after puncture, a small portion of the wall of the cyst was excised, and the edges of this opening were attached to the external wound. The biliary fistula thus formed bled freely for some days after the operation, and subsequently suppurated. The patient died from anæmia and exhaustion on the twenty-ninth day.

In the second case, the much-distended duct, which had been regarded as a hydatid cyst of the liver, was exposed by laparotomy, incised, and attached to the wound in the abdominal wall. The patient died from collapse on the eighth day.

In the third case, the dilated duct was opened and stitched to the external wound, under the supposition that the tumour was a distended gall-bladder.

In the fourth case, it is not clearly stated whether the duct was distended or not, though it probably was. In this instance, the hepatic portion of the divided duct was fixed to the surface of the abdominal wall after removal of the gall-bladder, the cystic duct, and a small portion of the liver for cancer. The patient did well for some time after the operation, but died six weeks later from exhaustion.

In his comments on these records, Terrier points out that in two of these cases the distension of the bile-duct, though clearly due to obstruction, was not associated with lithiasis. In the third case the duct was found to be completely obstructed at its intestinal orifice by a small calculus. In each instance of distended bile-duct, the gall-bladder was much shrunken, and its walls were sclerosed and surrounded by cicatricial tissue.

In the abstract of cases given below there will be found two cases of this kind. In one the operation of choledochostomy was performed after cholelithotripsy had been done, the patient making an excellent recovery; in the other choledoch-enterostomy, after cholecystectomy, the patient also doing well. Both patients are now in good health. (Cases 150 and 121.)

The first patient was a man of twenty-five, who had suffered severely from gall-stone symptoms associated with a tumour, supposed to be a dilated gall-bladder. The gall-bladder, however, was found to be small, and situated external to the cystic tumour, which proved to be a dilated cystic and common duct, at the lower end of which was a gall-stone the size of a pigeon's egg, which broke into fragments as the duct was about to be incised for its removal. The dilated duct was opened and stitched to the aponeurosis in the same manner as one fixes the gall-bladder in cholecystectomy. (Case 150.)

The second case was a woman of fifty-five, from whom a very thick gall-bladder, which had the appearance of malignant disease, was removed; the cystic duct was greatly dilated, and formed part of the tumour, and ~~there was no difficulty in introducing a~~ Murphy's button and connecting it to the intestine. (Case 121.)

Although hitherto the results of choledochostomy have not always been favourable, probably in consequence of the fact that extreme distension of the bile-duct is often accompanied by infection of the biliary passages, it would be well to reserve our opinion as to the prospects of the operation until we have more experience of it. Very little information can as yet be obtained on this subject, cases of extreme dis-

tension of the common bile-duct being very rare, and those in which surgery has intervened still more exceptional.

An interesting case is reported by Mr. W. P. Swain,* in which he connected a dilated bile-duct to the jejunum by a Murphy's button. The size of the tumour, which occurred in a girl of seventeen, and which was associated with gall-stones, may be gathered from the fact of over 7 pints of fluid having been withdrawn from it at the time of operation. Three months after, the patient was progressing satisfactorily, except for an occasional rise of temperature, and for the fact that the button had not been passed.

Dr. Russell† describes a case in a boy, aged eight years, whose illness began with an attack of pain in the right side of the abdomen, and some fever. Jaundice appeared on the second day, and on the next there was first noticed a tumour. Associated with the jaundice there were the usual constipation, clay-coloured, offensive stools, and bile-pigment in the urine. By the fifth day there was a large tumour continuous with the liver, filling the right lumbar region, extending below the anterior superior spine, and reaching almost to the middle line. The tumour was elastic, dull to percussion, and somewhat tender, and simulated closely a hydatid cyst of the liver, for which it was mistaken. In the right semilunar line, just below the costal margin, was a smaller rounded tumour which it was thought might be due to a distended gall-bladder. As it was believed that the child was suffering from catarrhal jaundice in addition to hydatid cyst of the liver, he was kept in bed ~~for sixteen days~~. During this period no bile passed through the common ~~duct, and the~~ icterus became more profound. At the end of this time he ~~began to suffer from~~ severe gall-stone colic without vomiting. At the operation the smaller tumour was found to be due to a distended gall-bladder full of colourless mucus; the larger was a retro-peritoneal cyst, from which, on aspiration, came clear fluid, and on incision some black, 'cinder-like' material (bilirubin). After operation, bile came from the cyst, which was stitched to the abdominal parietes. Death took place on the fifth

* *Lancet*, March 23, 1895.

† *Annals of Surgery*, December, 1897.

day after operation from hæmorrhage. At the post-mortem examination the retroperitoneal tumour was found to be formed by an immensely dilated common duct, the orifice of which was small and valvular. Dr. Russell was inclined to believe that this condition was congenital, and of the same nature as one form of congenital hydronephrosis. So long as the mucous membrane was normal at the orifice a certain amount of bile had been able to pass into the intestine, but immediately the catarrhal condition was set up this ceased to be possible. As a consequence the duct became further dilated, and so pressed on the valvular termination of the duct as to quite occlude the orifice.

Dr. Henry Ashby describes another case* in a girl, aged seven years, who had been ill for two and a half years with jaundice, progressive emaciation, and, latterly, distension of the abdomen and œdema of the feet. After 50 ounces of ascitic fluid had been removed from the abdomen, a large cyst was found occupying mainly the right side of the abdomen, and continuous, apparently, with the liver. On aspiration, 16 pints of dark-green mucus were removed; at varying intervals during the following three months the cyst was tapped on ten occasions, from 8 to 10 pints of bile-stained fluid being removed each time. Under this treatment she so improved that it was considered advisable to drain the cyst. This was done, and the drainage was continued for two months, during which time the whole of the bile escaped through the tube inserted into the cyst after it had been stitched to the abdominal wall. As a result of an attempt to connect the cyst with the bowel, peritonitis was set up, and the patient succumbed. At the autopsy, the cyst was found to be firmly attached to the under surface of the liver, and seemed to be formed by enormous distension of the common and cystic ducts. The hepatic duct opened into the cavity, but there was no communication between it and the duodenum.

Specimen No. 1,419, Guy's Museum, shows a dilatation of the common bile-duct. There is a thick-walled cyst 6 inches across, representing the common bile-duct; the portion of

* *Medical Chronicle*, October, 1898.

duct below this is less than the normal calibre, and has a valvular fold, which completely obstructs the lumen. The tumour was aspirated twice, $3\frac{1}{2}$ pints of bile being withdrawn on each occasion without relief. Then choledochostomy was performed, and death ensued two days after (Fig. 39).



FIG. 39.—DILATED COMMON BILE-DUCT, FORMING A THICK-WALLED CYST 6 INCHES IN DIAMETER.

The terminal $\frac{3}{4}$ inch of the duct was less than the normal calibre, with a valvular fold completely obstructing the lumen. It was twice aspirated of $3\frac{1}{2}$ pints of bile, and finally choledochostomy was performed, but the patient died two days after. (No. 1,419, Guy's Museum.)

Dr. Arnison had a case under his care in 1891, where he operated on what was apparently a pancreatic cyst, which he drained. The patient was extremely ill at the time, and only lived a few days. At the autopsy the operation was found to have been a choledochostomy, and the tumour to have been a dilated common bile-duct.

In the Hunterian Museum is a large tumour (Fig. 40) of the liver constituted by dilated hepatic ducts, which form a series of cysts within the substance of the liver itself. There was no obstruction in the main bile channel.



FIG. 40.—CYSTS IN LIVER, FORMED BY DILATED HEPATIC DUCTS.
(No. 2,758c, Royal College of Surgeons Museum.)

Solid tumours of the bile-ducts may be simple or malignant. *Simple tumour* is so rare that the following case (No. 234) is worth mentioning more fully:
During the twelve months before coming under observa-

tion the patient, a woman, aged forty, had had repeated attacks of what appeared to be appendicitis. Each attack began by acute pain in the right iliac region, associated with fever and vomiting, and followed by the appearance of a tender swelling in the usual situation of the appendix, and the ordinary symptoms and signs of a localized peritonitis in that region. At no time were there any symptoms to suggest cholelithiasis.

The patient was seen only once, after one of these seizures had subsided, and the diagnosis of relapsing appendicitis, which had been made by her ordinary medical attendant, was confirmed.

At the operation, the abdomen was opened over the cæcum, and the viscera in the neighbourhood were found all matted together. In the midst of these adhesions was found the gall-bladder, situated at the extremity of a Riedel's lobe, and containing muco-pus and several gall-stones. After these had been removed the cystic duct was found to be the seat of a tumour, and, as this gave the impression of a new growth, the gall-bladder and its duct, along with the projecting lobe of the liver, were removed by means of an elastic ligature. The patient made an uninterrupted recovery, and was heard of several months later as being quite well.

The tumour was examined by Mr. Targett, who reported that it was inflammatory in origin, and not due either to tuberculous disease or to cancer.

Drs. Wilks and Moxon ('Pathological Anatomy,' p. 485) describe what appears to have been an extreme example of a duct papilloma in a child of four years of age. The common bile-duct was dilated so as to form a cyst as large as a child's head, and was occupied by crowds of pedunculous myxomatous growths containing muscular fibre.

In Dr. Rolleston's paper, a case is referred to which makes it probable that an adenoma preceded cancer. Papilloma is probably an earlier stage of cancer, and is rare.

Mr. Bennett removed one from the common duct of a woman, aged fifty-eight, in St. George's Hospital, the specimen being shown at the Pathological Society of London in May, 1894. The growth was white and somewhat granular

to the naked eye, and was in immediate relation with an impacted gall-stone. The papilloma was apparently due to the irritation of the calculus, which, judging from the history, had been impacted for two months.

Of the *malignant tumours* we must take into consideration the two classes—primary and secondary, the former arising most frequently as the result of gall-stone irritation, the latter by extension from neighbouring organs.

Primary malignant disease of the bile-ducts is almost invariably, as might be expected from their histological structure, columnar-celled carcinoma. Musser collected eighteen cases, and found all of them to be formed by cylindrical-celled carcinoma; while out of other sixteen collected by Rolleston, fourteen showed similar histological characters, and two were cases of encephaloid cancer. That the growth may in the first instance be a papilloma, subsequently assuming malignancy, is suggested by the fact that the tumour usually projects into the lumen of the canal as a villous-like mass, while at the same time the submucous tissue is infiltrated to a greater or less extent.

The tumour is most frequently situated in the common duct towards its lower end; but the cystic or hepatic ducts may be first affected. In Musser's eighteen cases the hepatic ducts were alone involved three times, the cystic and hepatic ducts once, and the common duct fourteen times. Rolleston reports seventeen cases, and in these the common duct alone was the seat of the tumour on fifteen occasions (the lower end of the duct being involved ten times), and the cystic duct twice; but in one of the latter cases there was also an apparently distinct growth at the lower end of the common duct.

As is the case in malignant disease of the gall-bladder, so here, systemic infection is rare; but, by extension, the growth may infiltrate the neighbouring structures, the liver being most frequently involved. The lymphatic glands in the gastro-hepatic omentum are, of course, involved sooner or later in all cases.

Dr. Rolleston draws attention to the fact that, out of the thirty-six cases collected, gall-stones were present only in

half the number. He thinks that calculi are less frequently associated with primary cancer of the bile-ducts than with cancer of the gall-bladder. The same arguments apply, however, as in cancer of the gall-bladder, where the matter is fully discussed. In all probability the carcinoma is usually secondary to gall-stones, though these may not always be found, having passed into the bowel before the operation.

These growths are usually found between the ages of fifty and sixty, and unlike cancer of the gall-bladder, where rather more than 75 per cent. of the cases occur in women, the disease attacks both sexes about equally. Out of thirty-six cases, twenty-one occurred in males and fifteen in females.

Secondary carcinoma may occur from extension of malignant disease into the bile-ducts. Thus, one may find cancer of the bile-ducts supervening on cancer beginning in the liver, gall-bladder, pancreas, or intestine.

Symptoms.—If forming in the cystic duct, jaundice will be absent at first, only coming on when the growth advances so far as to press on the common duct and obstruct the passage of the bile, or when, as is not uncommon, catarrh of the bile-ducts supervenes. The gall-bladder enlarges at an early stage, and this will probably be the earliest sign; pain may be absent, unless gall-stones exist, when the usual spasmodic pains will occur so long as the muscular coat of the gall-bladder retains its contractile power.

When the growth is in the common duct, jaundice comes on at an early stage, and persists throughout, the liver gradually increasing in size, and the gall-bladder also enlarging ultimately; in the later stages, the changes in the character of the blood brings about a condition rendering the subject prone to hæmorrhages from the nose, bowel, etc., to a petechial eruption in the skin, and to a tendency to bleed from wounds, thus rendering operation extremely hazardous.

Associated with the absence of bile from the intestine there are usually, to a greater or less extent, gastro-intestinal symptoms, especially constipation or constipation alternating with diarrhœa.

Suppurative cholangitis is apt to supervene, the case then

taking on a more acute course, and being accompanied by fever, ague-like attacks, and rapid loss of flesh and strength. If the tumour form in the hepatic duct, jaundice will be the earliest symptom, and the case will resemble one of obstruction in the common duct, with the exception of an absence of enlargement of the gall-bladder. Needless to say, the disease is uniformly fatal, though operation may delay the final catastrophe.

Case 274, seen with Dr. Wardrop Griffith, is a good illustration of cancer of the ducts, and it shows also very well the usual history of gall-stone colic for a long period prior to the beginning of the malignant disease.

The patient, who was a woman aged sixty-two, gave a history of attacks of well-marked biliary colic since childhood. These seizures at first occurred about twice in the year; but latterly they had become much more frequent, and during the last year recurred about once a month.

The illness for which she sought treatment at the Leeds Infirmary began in April, 1899, like an ordinary gall-stone colic; but the jaundice, which was first noticed a week after the onset of pain, persisted, and got gradually more marked. Since then till her admission to hospital in July she had no recurrence of severe pain; but there had been occasional shooting pains in the upper abdomen, and constant tenderness in the region of the gall-bladder. She lost rapidly in strength and weight, and in July was 21 pounds lighter than she had been at the beginning of the year.

As medical treatment, persisted in for two and a half weeks, failed to give any relief, it was decided to have her transferred to the surgical side for operation.

When seen she was so ill that it was not considered safe to employ a general anæsthetic, especially as it was almost certain she was now the subject of malignant disease as well as gall-stones.

The operation was done on July 20, cocaine being the only anæsthetic used. The gall-bladder was aspirated, incised, and stitched to the parietes in the usual way, no attempt being made, on account of the weak condition of the patient, to exactly localize the obstruction.

Notwithstanding the apparent simplicity of the operation, and the absence of visceral exposure, there followed a considerable amount of shock.

There were hæmatemesis and some little hæmorrhage from the wound on the 21st and 22nd, and notwithstanding stimulation and other general treatment the patient gradually sank, dying from exhaustion on the 24th.

At the autopsy, besides extensive heart disease and granular kidneys, there were found two large stones, one in the gall-

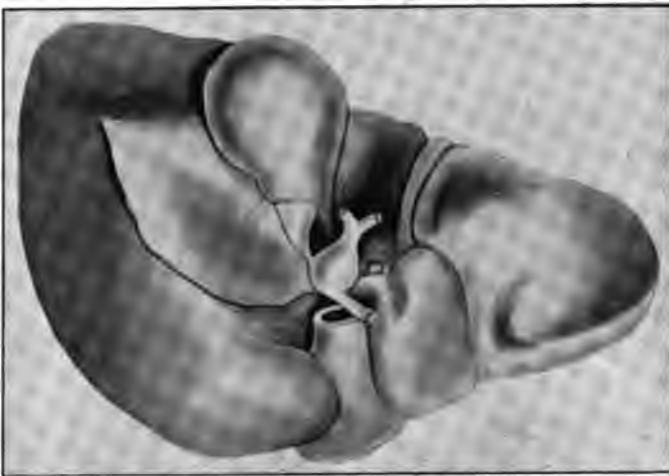


FIG. 41.—TUMOUR OCCUPYING THE JUNCTION OF HEPATIC, CYSTIC, AND COMMON DUCTS, AND COMPLETELY OCCLUDING THEM. (From drawing by Dr. Roberts.)

The hepatic ducts have been cut, and are turned forward.

bladder, the other impacted in the cystic duct. Situated at the junction of the cystic, hepatic, and common bile-ducts, was a growth about the size of a filbert, which was found, when the ducts were opened, to completely occlude them (see Fig. 41).

There were no adhesions in the neighbourhood, nor were there any secondary growths to be found. The stomach showed no evidences of ulceration, but there were slight signs of cirrhosis of the liver. There was no peritonitis.

Cancer of the ampulla of Vater was probably first described

by McNeal in 1835 in the *North American Arch.*, Baltimore, and was later drawn attention to by Stokes in 1846.* More recently the subject has been fully dealt with by M. Hanot,† M. Durand-Fardel,‡ M. Rendu and Dr. Rolleston.§ Two forms, at least, are described, one arising from the intestinal walls of the ampulla, and the other from the orifice of the common bile-duct and the pancreatic duct. They are characterized by intermittent jaundice, wasting, and



FIG. 42.—CANCER OF AMPULLA. (After drawing in *Trans. Path. and Clin. Soc., Glas.*)

Parts shown by dividing the duct on into the duodenum: *a*, Terminal part of duct with tumour; *b, c*, duodenum laid open; *d*, pylorus; *e*, stomach; *f*, liver (shaded dark); *g*, collapsed gall-bladder; *h*, probe passed from gall-bladder through aperture, and emerging in the midst of adherent omentum; *i*, suspensory ligament.

cachexia; but, as a rule, pain is absent. A typical case, ending in rupture of the gall-bladder and general peritonitis, is described by Dr. Coats and Dr. Finlayson, and the parts figured|| in the Transactions of the Pathological and Clinical Society of Glasgow (see Fig. 42).

* *Dublin Quarterly Journal of Medical Science*, 1846.

† *Archives G n rales de M decine*, November, 1896.

‡ *La Presse M dicale*, 1896. § *Medical Chronicle*, 1895.

|| *Trans. Path. and Clin. Soc., Glas.*, vol. iii.

Diagnosis.—The diagnosis of new growth in the bile-ducts, from gall-stones, is practically impossible, as the symptoms are the same, and, in fact, the two frequently co-exist. The absence of pain in some cases and the rapid deterioration of health may afford a little help, but in others the pain may be as acute as in cholelithiasis.

Cystic dilatation of the bile-ducts is often indistinguishable from enlargement of the gall-bladder (as in Terrier's third case and in my own first case), for which it is usually mistaken; but it may resemble a cyst of the pancreas, as in Dr. Arnison's case and in Mr. Terrier's first case, or a hydatid tumour of the liver, as in the second case of the latter and in Dr. Russell's patient; but, as the treatment in all these conditions is abdominal section, no harm will be done if the diagnosis is only completed when the abdomen is opened.

Treatment.—The operative treatment of these tumours is in its infancy, and has thus far not proved uniformly satisfactory. Any growth should be removed if possible, but where that is impracticable, the dilated gall-bladder or ducts may be opened and drained, or, better still, drained into the duodenum or jejunum by means of a Murphy's button.

If the case can be diagnosed, cancer of the orifice of the common bile-duct could be attacked through the duodenum, and even if too extensive for removal, the papilla could be laid open as in the operation of duodeno-choledochotomy, thus giving relief to the jaundice.

If the cause be a removable one, such as a gall-stone, it should be taken away. Choledochostomy has not yielded good results in cystic dilatation of the bile-ducts, my own case being, I believe, the only example of recovery after the operation, whereas the experiences of performing an anastomosis between the cyst and the intestine, though as yet slight, has been so satisfactory as to establish its claim to being considered the best method of treatment.

CHAPTER V.

GALL-STONES, OR CHOLELITHIASIS.

THE importance of this subject may be gathered from the facts that post-mortem records on persons of all ages and both sexes prove gall-stones to be present in from 5 to 10 per cent. of all Europeans; in Strasburg the record being 12 per cent. (Schroeder), in Kiel 5 per cent., and in Manchester 4·4 per cent. (Brockbank).

Pathology and Etiology—Gall-stones, which, when small, are often spoken of as biliary sand, may vary in size from a concretion just perceptible to the naked eye up to a mass the size of a tennis-ball, or even larger. The following description and illustration (Fig. 43) of the largest gall-stone that has, so far as we know, been described, are taken from Mr. Hutchinson's *Archives of Surgery* for July, 1891, the original source being Dr. Spen's translation of Dr. Aug. G. Richter's work, entitled 'Medical and Surgical Observations,' published in 1793:

Enormous Gall-stone removed after Death.—Concerning this case Richter writes: 'There was a stone in the ductus choledochus which, on account of its uncommon size, I have caused to be engraved in the annexed figure. It weighed 3 ounces 5 drachms. All round the stone was fluid bile, so that this fluid had evidently passed by the stone into the duodenum. It fell into three pieces on being taken out. The external surface resembled a very firm extract of liquorice. On some places there were evident marks of other stones adhering to it. The thick end of the stone was in the duodenum; the most pointed was turned towards the neck of the gall-bladder.'

They may be round, egg-shaped, barrel-shaped, elongated with pointed ends, or angular, the surface being smooth, mammilated or irregularly faceted. Gall-stones, when large, are often single, but when small or moderate in size they are



FIG. 43.—LARGEST GALL-STONE EVER DESCRIBED.

usually numerous, and several hundreds may be found; for instance, in Case 67 there were successfully removed by cholecystotomy no less than 720 gall-stones from the gall-bladder and dilated cystic duct of a woman aged fifty-six. Their

colour is variable ; in some cases it is white or gray, in others very dark, or even quite black, but the usual colour is a dark yellow or brown. In consistency they are ordinarily firm, but as a rule may, without much difficulty, be fractured by pressure between the thumb and forefinger, the fracture being crystalline ; they may, however, be as hard as a lithic acid calculus, or as soft as half-set putty. The chief constituent of gall-stones is cholesterin, which always occurs in the crystalline form ; but bile-pigments, bile-salts, lime, mucus, degenerated epithelium, and rarely foreign bodies, may enter into their composition. Margarate, stearate, and palmitate of lime combined with mucus usually form the cement which binds the cholesterin crystals together to form a concretion.

Gall-stones formed almost entirely of bile-pigment may be seen. On two occasions among the series of operations given below, there were found soft concretions of this nature in large numbers in the hepatic ducts within the liver. Since cholesterin is the chief constituent of gall-stones, in considering their formation our attention must be directed chiefly to the physiology of this monatomic alcohol, which occurs normally not only in the blood, but also in the various organs of the body. Although cholesterin is always present in the blood in a proportion, according to different authors, varying from '045 to 1·18 per cent., very little is known of the processes which determine its existence. As there is no proof that the liver excretes cholesterin from the blood, or that it is a result of hepatic metabolism, we are driven to the conclusion that it is formed in the bile-ducts or gall-bladder ; and, as it is found in other passages lined by mucous membrane where there is no bile near, there is no reason to believe that it is formed from any constituent of the bile, but rather that it is a product of the epithelium of the bile-passages.

That cholesterin, when ordinarily present in all persons, should form concretions in some, and not in others, may depend on several causes ; possibly in some cases cholesterin occurs in positive excess, while in others there may be a diminution of the bile-salts which should hold it in solution, or it may even be precipitated from solution.

There is no doubt that catarrh of the mucous membrane of the bile-passages increases the amount of cholesterin present, and that the longer bile remains in the gall-bladder the more cholesterin will it contain. Anything, therefore, which causes stagnation of bile may predispose to gall-stones; on the other hand, whatever leads to a regular emptying of the bile-passages will tend to clear out such detritus as cast-off cells, incipient collections of cholesterin crystals, and mucus, and thus to prevent the formation of gall-stones.

The view is gradually gaining ground that biliary calculi very frequently have a bacterial origin, the organisms principally concerned being the *Bacillus coli communis* or the typhoid bacillus, though other organisms may participate in the process. Bernheim, in 1880, was the first to direct attention to the connection between typhoid fever and cholelithiasis. In Professor Halstead's clinic, about one-third of the cases operated on for gall-stones gave a history of typhoid fever at intervals of from a few months to several years. We have noted the previous history of typhoid in many cases of cholelithiasis, and in some the relation between the two has seemed very direct.

The occurrence of the fever may be long antecedent to the appearance of symptoms of cholelithiasis, and yet the relationship may be a true cause and effect. Thus, in Case 260, the patient, aged forty-eight, gave a history of typhoid fever twenty years previously, accompanied by pain and tenderness beneath the right costal margin, and followed within the year by so-called 'spasms,' which had continued with intermissions for the whole intervening period. The attacks for the last two years were regularly followed by slight jaundice and accompanied by pain over the left side of the abdomen, and by vomiting, the whole leading to great deterioration of health and to loss of weight to the extent of 3 stones. When seen there was tenderness at a point midway between the ninth costal cartilage and the umbilicus, which we have found to be almost as significant of inflammatory trouble about the gall-bladder as is tenderness at McBurney's point of appendicitis. This sign, together with slight icterus after each attack, led to the diagnosis of gall-stones, although the pain

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terly been more especially on the left side of the abdomen. The left-sided pain, as was pointed out some time ago (by the author), is always associated with adhesions between the pylorus and gall-bladder or bile-ducts, and from this and similar cases it almost seems as if, when this event occurs, a transference of the pain takes place from the right to the left side, as in reflected pain in other parts of the body. There was also well-marked dilatation of the stomach, showing that the visceral adhesions were producing a difficulty in the passage of food into the duodenum. At the operation the diagnosis was confirmed in every particular, and after the removal of forty-six stones from the cystic duct, 'one of them projecting into the common duct,' and detaching adhesions, the gall-bladder was drained. Recovery was uninterrupted, and the patient is now well in every respect. There has been no pain since, and no vomiting; digestion is perfect, and the patient has regained her lost weight.

In 1886 microbes were found in biliary calculi by M. Galippe. Gilbert, Dominici, and Fournier examined calculi from seventy cases, and found the *Bacillus coli communis* either living or dead in one-third of the cases. They have performed a number of experiments* on animals, which seem to show that not only do the *Bacillus coli communis* and the typhoid bacillus set up a cholecystitis, but that this tends to the formation of gall-stones. In two cases they succeeded in inducing the formation of perfect calculi in a dog and a rabbit injected with the *Bacillus coli communis*. Mignot has not only confirmed these results, but has gone further.† He succeeded in producing typical calculi in guinea-pigs, and has obtained the following results:

1. Foreign bodies when introduced into the gall-bladder can stay there for an indefinite time, provided they are aseptic, without causing inflammation or precipitating the solids from the bile.
2. Foreign bodies previously impregnated with virulent micro-organisms cause a more or less intense cholecystitis

* *Archives Générales de Médecine*, September, 1898.

† *Ibid.*, August, 1898; and *British Medical Journal* Supplement, December 3, 1898.

and precipitate the solids from the bile. As long as the bacteria retain their virulence, however, they cannot form a calculus, but only a sediment mixed with pus. This sediment has no tendency to cohere or to adhere to foreign bodies.

He then shows why previous attempts to form calculi have failed. The bacteria must be attenuated, not virulent. This is best attained by growing them for some months in bile to which constantly decreasing amounts of broth are added. When sufficiently attenuated they are no longer pathogenic when injected into the cellular tissue of animals. On injecting these into the gall-bladder, stones are occasionally formed, but more often the bacteria are washed out into the intestine. If, however, a foreign body, especially if porous, such as cotton-wool, be placed in the bladder, and fixed to its walls to prevent expulsion, a stone is formed round it with the greatest certainty. Five or six months are required for the formation of a perfect calculus. The form of bacteria injected seems to be of quite secondary importance. Mignot has proved that the typhoid bacillus, the *B. coli*, staphylococci, streptococci, and even the non-pathogenic *B. subtilis*, are capable of giving rise to calculi, and probably a great number of other organisms are equally potent.

Among the remoter causes we must consider age, sex, habits, dress, diet, diathetic condition, and disease.

Age.—Although gall-stones may occur at any age, even in the newly-born, they are rarely found under the age of 25 or 30. Schroeder says that under the age of 20 the percentage is 2·4; from 20 to 30, 3·2; from 30 to 40, 11·5; from 40 to 50, 11·1; from 50 to 60, 9·9; and over 60, 25·2 per cent. Judging from a paper* by Dr. G. F. Still, biliary calculi in young children are met with not infrequently. He gives three cases in which a necropsy had been performed within six months at the Great Ormond Street Hospital for Children. In the first, a child aged nine months, there were vomiting and clay-coloured stools, but neither jaundice nor colic. After death (which occurred from other causes) there were found eleven small, black, friable calculi composed of pigment, three of which were impacted in the common duct.

* *British Medical Journal*, April 8, 1899.

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second case was that of a girl, aged eight months, who of tuberculous meningitis. There was neither jaundice nor abdominal pain; but at the post-mortem examination there were found three minute calculi of pigment in the gall-bladder. In the third case, a boy (age not given), there were abdominal pain and vomiting, but no jaundice; the calculi were of the same kind. He described a fourth case where there had been recurrences of vomiting, abdominal pain, and jaundice. Altogether he has been able to collect twenty cases in children, ten of which were in infants. He was of opinion that biliary calculi might be formed during intra-uterine life, and thought that the viscosity of the bile in infancy was probably connected with the formation of such concretions.

Sex.—Gall-stones occur more frequently in women than in men. Schroeder states that in Germany they are found in 20 per cent. of female, and in 4·4 per cent. of male, necropsies. Out of 228 autopsies on women in the Royal Infirmary, Manchester, Dr. Brockbank found 18, and out of 542 post-mortem examinations in men 16 cases of gall-stones, which gives 7·9 per cent. in females, and 2·9 per cent. in male subjects. Pregnancy would seem to be a factor in the causation of gall-stones, as, in a large series of cases, 90 per cent. of the women affected had borne children. The wearing of corsets, which tends to force down the front of the liver and to depress the fundus of the gall-bladder, is probably a distinct etiological factor, especially when combined with deficient exercise.

Habits.—Want of exercise, whether from lethargy or from necessity, as in some forms of chronic heart disease, leads to stagnation of bile in the gall-bladder, and to the deposition of cholesterin, since the gall-bladder is unaided in its expulsive efforts by the contraction of the abdominal muscles.

Diet.—The following facts go far to prove that diet exercises a strong influence in the formation of gall-stones. It seems probable that free cholesterin in the bile-passages is due, in some cases, to a deficiency of its solvents in the bile, these solvents being the glycocholate and taurocholate of soda which arise from the metabolism of nitrogenous foods. If the supply of nitrogen in the food be limited, the bile-salts

X are likely to be diminished, and cholesterin may be precipitated. This may serve to explain the presence of gall-stones in gouty persons, who, on account of their uric acid diathesis, limit their intake of nitrogen. The larger consumption of farinaceous food in Germany may also serve to explain the greater prevalence of gall-stones there, than in England, where meat enters more extensively into the dietary. In

X diabetes, where nitrogenous food is prescribed, gall-stones are rarely found. Dr. Thudichum, in his work on gall-stones, states that he cannot find any recorded instances of the discovery of gall-stones in the wild carnivora, though on two occasions they have been found in the gall-bladders of domesticated carnivora. On the other hand, Dr. Brockbank could find no evidence of their occurrence in wild herbivora, though at times they are found in domesticated horses, cattle, and sheep, as well as in pigs. Moreover, in pampered dogs fed on farinaceous foods they are found occasionally. In man, who is omnivorous, they occur in

X from 5 to 10 per cent. It will thus be seen that in those who take an abundance of albuminous materials in their food, and where, therefore, the bile-salts are in sufficient quantity, there is little tendency to the deposition of cholesterin; whereas when little albuminous food is taken, and the bile-salts are presumably insufficient to hold the cholesterin in solution, gall-stones are likely to form; this tendency is aided by insufficient exercise, as in stall-fed cattle, pampered dogs, and indolent men. The formation of some gall-stones containing lime has been attributed to the drinking of hard water, but this is by no means proved; but an insufficiency of diluent drinks may possibly act as a cause.

A case of Dr. Homan's, operated on in June, 1897, is of interest as showing the time in which gall-stones may form. In April, 1895, he removed a number of stones from the gall-bladder, and used silk sutures; the symptoms returning at the end of 1896, cholecystotomy was again performed, and several good-sized stones were removed and found to have the silk sutures as their nuclei.

Symptoms.—In discussing the symptoms of cholelithiasis, we must note, in the first place, that gall-stones may be

found post-mortem without having produced any symptoms during life. In such cases they are, as a rule, in the gall-bladder, while the ducts are free, and there are no signs of irritation in the shape of adhesions. Indeed, there can be no doubt that a large gall-stone may even ulcerate its way into the bowel, and produce symptoms of intestinal obstruction with few or no signs to indicate that such serious organic mischief has been going on. It follows, therefore, that in considering cases of intestinal obstruction gall-stones cannot be excluded, though there has been no symptom of cholelithiasis. It is just possible that as some persons pass urinary stones with few or no symptoms, so others may pass small biliary calculi; this, however, has yet to be proved, and in the meantime it is difficult to explain why in some persons gall-stones should produce such serious troubles, while in others it gives rise to none at all.

In certain cases there may be a history of dyspepsia, with depression of spirits and a feeling of discomfort or weight, or even ill-defined pains over the right side of the abdomen, but an entire absence of those characteristic symptoms which give definiteness to diagnosis.

The ordinary symptoms of cholelithiasis are paroxysmal attacks of pain, which, occurring at irregular intervals and often without apparent cause, start in the right hypochondrium or in the epigastrium, and radiate thence over the abdomen and through to the right subscapular region. These attacks are often accompanied by sickness or vomiting, and, if severe, by collapse. They may be followed by jaundice with its well-known symptoms, but this is frequently absent. At times a feeling of fulness in the right hypochondrium accompanies the attack; but the formation of a tumour does not occur, as a rule, unless the ducts are blocked. Accompanying these special symptoms will usually be found much depression of spirits, want of appetite, dyspepsia, and loss of weight.

According to Naunyn, there is a regular and an irregular form of the disease. The former occurs where the calculi are simply lodged in the gall-bladder or pass along the ducts; the latter is seen when there is infectious angiocholitis, with

abscess in the liver, fistula, or other complications. (See sections on inflammatory affections of the gall-bladder and bile-ducts.)

The following symptoms will be considered in detail:

(a) *Paroxysmal Pain*.—For the most part the patient complains of pain under the right costal margin or in the epigastrium, whence it radiates over the abdomen and to the right subscapular region; but in some cases the pain radiates to the left shoulder. These attacks come on suddenly when the patient is quite well, and usually end by causing nausea or an attack of vomiting. The vomiting leads to relaxation of the duct, and if the gall-stone be small it may pass on and thus end the attack. The seizures come on without apparent cause, although at times they may appear to be brought on by exertion or by taking food. Not infrequently after an attack has passed off, a dull aching is felt in the region of the gall-bladder for some time, perhaps until another seizure. In several cases we have noticed the pain begin on the left side over the stomach, and in these we have always found adhesion of the stomach to the gall-bladder or bile-ducts.

(b) *Vomiting*.—Though, as a rule, the vomiting is paroxysmal and associated with the colic, it may be almost continuous, and so of itself prove dangerous. In one case of this kind (No. 29) the patient was so weak from persistent vomiting that it was feared she could scarcely bear the operation it was necessary to perform. Even after the source of irritation had been removed the vomiting persisted for days; ultimately, however, she made a good recovery. In another case, which was seen in the South of Ireland (No. 92), the vomiting had been so incessant that the patient had been fed almost solely by nutrient enemata for six weeks before operation; and even afterwards, though the operation was satisfactory, and the after-progress in other respects all that could be desired, the emesis persisted for a fortnight, and ultimately caused the death of the patient from sheer exhaustion. The vomiting, as a rule, occurs towards the end of a seizure, and, in fact, frequently determines its cessation. In such cases the stomach contents are first rejected, after which,

if the common duct be free, bile is vomited ; at times, however, in the severe cases, vomiting becomes stercoraceous.

(c) *Collapse*.—Occasionally a patient becomes so profoundly collapsed from an attack of gall-stone colic as to give rise to great difficulty in diagnosis, the case being more like one of perforation of some abdominal viscus or of intra-abdominal hæmorrhage ; but the history of previous seizures, and of the onset of the attack from which the patient is suffering, will usually help one to arrive at a correct diagnosis. The acute, agonizing pain may of itself cause death, as in the case of a lady seen in consultation, and where the presence of gall-stones was diagnosed. The next attack of pain unfortunately proved fatal, and at the autopsy a gall-stone was found half extruded into the duodenum.

Not only may the agonizing pain of a single attack prove fatal, but repeated attacks of pain occurring without sufficient interval for recuperation may produce very serious deterioration of health, or even death from sheer exhaustion.

(d) *The formation of a tumour* in the region of the gall-bladder is seldom seen in acute cases ; but it may be noticed with each attack, and is then due to the violent contraction of the muscular wall of the gall-bladder on its contents. It is, however, a frequent sign in the more chronic cases, and is fully discussed in the section on tumours of the gall-bladder.

(e) The presence of *gall-stones in the motions* after an attack is valuable evidence, but their absence does not negative cholelithiasis. It is quite usual in cases submitted to operation to find gall-stones where none had at any time been detected in the motions, although diligently looked for after attacks of colic.

The way to search for gall-stones is to let the patient pass the motion into a solution of carbolic acid, to have it well stirred, and then to pass it through a fine sieve with about $\frac{1}{8}$ inch mesh.

(f) *Jaundice*.—So long as the gall-stones are in the gall-bladder or cystic duct, there is nothing to prevent the bile passing down the common duct into the intestine ; jaundice

is therefore absent in the greater number of cases of cholelithiasis, or, if present, shows only as a slight icteric tinge in the conjunctivæ, which is induced by catarrh spreading from the gall-bladder and cystic duct to the common and hepatic ducts. Should the gall-stones be impacted in the common duct, the passage of bile is obstructed and jaundice ensues. Intermitting jaundice may also occur if a small gall-stone in the common duct acts as a ball-valve. In deeply jaundiced cases, a decision concerning operation is frequently difficult, since chronic jaundice too often indicates malignant disease, and not only do patients with cancer bear operations badly, but when jaundice is associated with it, there is the same tendency to persistent oozing of blood from the wound after operation as there is to spontaneous hæmorrhage where no operative measures have been undertaken.

Dr. Ord drew attention to the production of intermittent pyrexia by gall-stones, and stated that his attention had first been called to this symptom by some remarks of the late Dr. Murchison on the case of a distinguished medical officer, who, after his return to England, was attacked at regular weekly intervals with paroxysms of shivering, followed by fever and sweating. He was supposed at first to have a recurrence of an old intermittent fever, and, later, to have hepatic abscess; but at last his symptoms indicated, and the necropsy proved, that his actual and only disease was a gall-stone so impacted as to produce great irritation, but not complete obstruction of the common duct. Similar cases have been noticed by Charcot, who argued that the fever is due to the absorption of some poison into the blood. Dr. Murchison was of opinion that such attacks are not of a poisonous or septic origin, but are due to nervous irritation. From the cases we have seen, we should think that both explanations are admissible, the fever being not unlike that known as 'urethral,' in which the same contention as to causation arises.

In a very interesting and important paper Dr. Osler, of Baltimore, says that the combination of the following symptoms is characteristic of the existence of gall-stones in the common duct, and is therefore valuable in distinguish-

ing between this form of obstruction and that arising from malignant tumour alone :

1. Jaundice of varying intensity deepening after each paroxysm, which may persist for months, or even years.

2. Ague-like paroxysms characterized by chill, sweating, and fever, and followed by deepening of the pre-existent jaundice.

3. At the time of the paroxysm, pains in the region of the liver with epigastric disturbance.

This opinion is fully borne out by our experience, and in a number of cases of jaundice of several months' duration, where there was this combination of symptoms, gall-stones were found in the common duct.

In addition to the symptoms already mentioned, the following complications may be met with, and may constitute the prominent conditions threatening life and requiring treatment, the original cause having perhaps disappeared, or become masked by its more serious sequelæ :

1. Ileus due to atony of the bowel, leading to enormous distension, and to the symptoms and appearances of acute intestinal obstruction, apparently the consequence of the violent pain.

2. Acute intestinal obstruction dependent on—

- (a) Paralysis of gut due to local peritonitis in the neighbourhood of the gall-bladder.

- (b) Volvulus of small intestine.

- (c) Stricture of intestine by adventitious bands originally produced as a result of gall-stones.

- (d) Impaction of a large gall-stone in some part of the intestine after ulcerating its way from the bile channels into the bowel.

3. General hæmorrhages, the result of long-continued jaundice, dependent either on gall-stones alone, or on cholelithiasis associated with malignant disease.

4. Localized peritonitis producing adhesions, which may then become a source of pain even after the gall-stones have been got rid of. We believe that nearly every serious attack of biliary colic is accompanied by adhesive peritonitis, as

experience shows that adhesions are found practically in all cases where there have been characteristic seizures.

5. Dilatation of the stomach dependent on adhesions around the pylorus.

6. Ulceration of the bile-passages, establishing a fistula between them and the intestine.

7. Stricture of the cystic or common duct.

8. Abscess of the liver.

9. Localized peritoneal abscess.

10. Abscess in the abdominal wall.

11. Fistula at the umbilicus, or elsewhere on the surface of the abdomen, discharging mucus, muco-pus, or bile.

12. Empyema of the gall-bladder.

13. Infective and suppurative cholangitis.

14. Septicæmia or pyæmia.

15. Phlegmonous cholecystitis.

16. Gangrene of the gall-bladder.

17. Perforative peritonitis due to ulceration through, or to rupture of, the gall-bladder or the ducts.

18. Extravasation of bile into the general peritoneal cavity.

19. Pyelitis on the right side due to a gall-stone ulcerating its way into, or an abscess of the gall-bladder bursting into, the pelvis of the kidney.

20. Cancer of the gall-bladder or of the ducts.

21. Subphrenic abscess.

22. Empyema of the right pleura.

23. Pneumonia of the lower lobe of the right lung.

24. Chronic invalidism and inability to perform any of the ordinary business or social duties of life.

25. Suppurative pancreatitis.

26. Chronic interstitial pancreatitis.

27. Infective endocarditis.

28. Cirrhosis of liver.

Diagnosis.—In the sections on Tumours of the Gall-bladder, and on Inflammatory Affections of the Bile-passages the diagnosis of the complications of gall-stones is more fully dwelt on, so that here it is only necessary to discuss uncomplicated cholelithiasis. In this connection we have to consider the several ailments which may produce

painful seizures in the right side of the abdomen. These are, hysteria or nervous spasms, acute dyspepsia with flatulence, appendicular colic with appendicitis, right renal colic, spinal neuralgia, malignant growth in or near the liver, pyloric stenosis, and lead colic.

The diagnosis chiefly rests on paroxysmal attacks of pain starting in the right hypochondrium and radiating thence over the abdomen and through to the right scapula, the attacks being often accompanied by vomiting or collapse, and sometimes followed by jaundice, although this is frequently absent. If jaundice be persistent the presence of malignant disease should be suspected; if it be dependent on gall-stones, ague-like attacks will probably occur.

Just as in appendicitis there is tenderness over McBurney's point, so in gall-stones, with very few exceptions, marked tenderness will be found on pressing the finger deeply over the region of the gall-bladder, or over some point in a line from the ninth costal cartilage to the umbilicus. In some cases the pain in the so-called 'spasms' is referred to the left side, radiating thence to the left infrascapular region; and in operating on such cases it will be found, as mentioned above, that the pylorus is adherent to the gall-bladder or cystic duct.

In hysteria the irregularity in the character of the attacks, their association with other nervous phenomena, such as polyuria, globus hystericus, and so forth, together with the absence of collapse and of the physical signs of gall-stones, will enable one to arrive at a correct conclusion. As a rule, there will be little difficulty in distinguishing cholelithiasis from acute dyspepsia with flatulence. The relief following on simple treatment, the pain over the stomach rather than over the gall-bladder, the discovery of a manifest cause, and the absence of serious symptoms, readily enable the distinction between so-called 'stomach spasms' and gall-stones to be made.

In appendicular colic, the almost invariable sign of tenderness at a point midway between the anterior superior spine of the right ilium and the umbilicus (McBurney's point), the presence of a swelling in the right iliac fossa, or near it, and the absence of right scapular pain, render the diagnosis of this

condition free from serious difficulty, though in cases of phlegmonous cholecystitis with peritonitis the latter has sometimes been attributed to appendicitis instead of to its actual cause. In right renal colic the associated urinary symptoms, together with the condition of the urine and the pain passing down the right genito-crural nerve into the testicle, are distinctive.

In lead colic, the more or less persistent stomach-ache, the constipation, the absence of the usual gall-bladder paroxysms, and the presence of a blue line on the gums, will usually assist in the diagnosis; but in a doubtful case the result of treatment by iodide of potassium and saline aperients will soon clear up the diagnosis.

In pyloric stenosis, if accompanied by adhesions around the pylorus, the symptoms are not unlike those of gall-stones, with which, in fact, the affection may be associated, as in several cases related before the Clinical Society in 1889.* The presence of dilatation of the stomach, the characteristic vomit, the contractions of the stomach wall, the pain in the left of the abdomen, and the absence of the characteristic gall-bladder pain, will usually establish the diagnosis.

In spinal neuralgia, the presence of tenderness over the spine, the course of the pain along the branches of the corresponding spinal nerves, and the absence of collapse or of vomiting, put aside all difficulty in most cases.

In malignant disease, the absence of pain, or, when present, its continuous character, the gradual and persistent loss of flesh, and the more marked failure of strength, usually indicate the serious nature of the affection. The persistence and gradual deepening of jaundice when once it supervenes, the absence of ague-like attacks, and, if the disease involve the head of the pancreas, the almost constant presence of a palpable tumour due to enlargement of the gall-bladder, afford landmarks which, as a rule, prove true guides; but in many cases gall-stones exist along with malignant disease, and then these symptoms become indeterminate, though the rapid wasting and loss of flesh will often lead to a successful diagnosis of the co-existence of the two conditions. If nodules

* Transactions of Clinical Society, 1889.

form in the liver, and ascites with œdema of the feet supervene, the condition becomes manifest at once.

The so-called diagnostic operations of sounding for gall-stones, and aspiration of a distended gall-bladder are not only futile but dangerous; a small exploratory incision is safer and far better, whether for information or treatment.

The **Treatment** of gall-stones may be considered under the heads preventive, palliative, and radical. The first two resolve themselves into medical, the last into surgical, treatment.

Medical Treatment.

The preventive treatment of cholelithiasis is chiefly a matter of attention to diet, exercise, and general hygienic surroundings. As women suffer from gall-stones much more frequently than men, it has been thought that their mode of dress, and especially the wearing of stays, may be one of the causes; but probably the want of sufficient exercise, with constipation and rich living, its frequent concomitants, is more to blame. In prescribing prophylactic measures one would recommend rational clothing (which, of course, includes the avoidance of tight lacing), temperance in diet, warm baths, fresh air, and regular exercise. In regard to diet, more depends on temperance than on the choice or refusal of certain foods. In giving directions on diet, patients may with advantage be told to avoid over-indulgence in sweet and starchy foods, and in rich dishes, which tend to induce dyspepsia. Alcohol should only be taken in moderation, well diluted, and with food.

In accordance with the views expressed in considering the causation of gall-stones, either a sufficiency of albuminous food in the shape of meat or game, or farinaceous foods containing a fair proportion of nitrogen, should be taken. If there is any benefit to be obtained by the administration of olive-oil, the use of butter or of animal fats, taken in quantities short of producing dyspepsia, should have a similar effect. Dr. Lauder Brunton gives some valuable hints on treatment, and shows how the system of dieting adopted at certain watering-places, when combined with exercise and the administration of diluent beverages (water being the essential

element), has very beneficial results. It is a very good plan to recommend patients suffering from cholelithiasis to drink a tumberful of the natural Carlsbad water with a little hot water before breakfast, and a tumblerful of simple hot water before the later meals; for there can be little doubt that, as a rule, too little water is taken, and the inspissated or stagnant bile and mucous deposit, if not removed, will tend in the long-run to form concretions; just as drains, if not flushed from time to time, will become blocked by the deposition of solid matter.

Alkaline saline waters (particularly the hot Carlsbad) act beneficially by stimulating the peristalsis of the digestive tract, and so increasing the flow of blood to the abdominal organs. In the peristalsis the bile-passages participate, and the movement of the bowel acts as a form of massage, while the diseased mucous membrane benefits by the increased flow of blood. The injection of large quantities of hot water into the rectum serves the same purpose.

When gall-stones have once formed, no medicine, so far as we know, can dissolve them or produce any material benefit except by way of palliation. Although numerous remedies have been vaunted as beneficial in the dissolution of gall-stones, their advocates have argued as if the stones were in a test-tube, forgetting, apparently, that no drug can reach the concretions save by a very circuitous route and in an extremely diluted form; thus, benzoic acid, benzoate of soda, salicylic acid, turpentine, ether, chloroform, and numerous other agents reported to be beneficial, can really have no material effect. We would not for a moment say, however, that rational medical treatment may not restrict the increase of gall-stones already formed, or prevent the formation of new ones, and thus prove really curative if the patient have the good fortune to part with those already formed.

The experiments of Dr. Brockbank effectually dispose of the supposition that the so-called saline cholagogues have any solvent action on gall-stones; for, after allowing concretions to stand in a 1 per cent. solution of the various salts for fourteen days, and then weighing them, he found that there had been no loss of weight. Among the drugs thus

experimented on, were the salicylate, the sulphate, the benzoate, the phosphate, the bicarbonate, and the chloride of soda, sulphate of potash, and chloride of ammonium.

Similar experiments with olive-oil, oleic acid, and a solution of *sapo animalis* yielded far different results. A gall-stone placed in pure olive-oil lost 68 per cent. of its original weight in two days, and then broke up into small pieces. With pure oleic acid a similar result followed in a much shorter space of time, a small gall-stone disappearing in twenty-four hours, and a larger one, after losing 63 per cent. of its weight in two days, broke up into small fragments in four days. The effect of a solution of animal soap on the concretion is remarkable; after standing for a few hours in a 5 per cent. solution, a gall-stone becomes coated with a bluish-white filmy material, and in time the solid matter becomes viscid. In view of the fact that the administration of olive-oil is said to have a curative effect in cholelithiasis, these experiments are interesting; but, as there is not the slightest evidence that the oil can reach the gall-stone in the gall-bladder or cystic duct, there must be some other than direct solvent action to explain the beneficial effect; indeed, that such an effect takes place is doubted by some observers, and requires more direct proof before it can be accepted. An explanation of what occurs is offered by Dr. Brockbank in his book:* 'Another explanation of the reported disappearance of the gall-stones after large doses of oil may be derived from the action of soap and fats on cholesterin. A digested fat passes into the circulation from the alimentary canal in three forms: as unchanged fat, as the corresponding fatty acid, and as soap. All occur normally in the bile, and the amount present in the bile increases with the amount of fat taken in the diet. Oil, fatty acids, and soaps all dissolve cholesterin readily and break up a gall-stone. If, then, the oil, fatty acid, and soap appear in the bile in increased amount after large doses of oil, it is very probable that the gall-stone is attacked by them, especially by the soap, and in time is dissolved or so reduced in bulk as to be enabled to pass out into the duodenum.'

* 'On Gall-stones,' E. M. Brockbank. London, 1896.

We have tried olive-oil in large doses in many cases, and cannot say that we have seen much good to result from its employment, unless, perhaps, in one case of impacted calculi in the common duct, where an operation was performed after the olive-oil treatment had been tried for some weeks. The gall-stones were then found to yield more readily than usual to the pressure of the finger and thumb, as if the treatment had lessened their consistency.

The oil may be administered either by the mouth or by the rectum; in either case from 2 to 10 ounces should be given daily. It is not readily taken except with food, and even then it is apt to give rise to dyspepsia.

Dr. Goodhart* gives an account of five cases of probable cholelithiasis in which olive-oil had been administered with apparent benefit. He remarks: 'With reference to the results, I wish to say that it is obvious that I cannot claim for these cases anything more than a suspicion in favour of the value of the administration of oil. In no one of the cases have gall-stones been proved to have passed, and in none of the cases has improvement been so immediate that effect and cause certainly go together.'

Dr. Kishkin's experiments appear to show how a mistaken idea of its good effects has arisen. The supposed calculi which were parted with were found to consist of oleic, palmitic, and margaric acids combined with lime; and similar concretions could be produced at any time by giving olive-oil to any persons suffering from scanty biliary secretion. No true gall-stones were ever found in the motions after the olive-oil treatment.

The administration of eunatrol (oleate of soda) in the form of pill has appeared to do good in some cases that either declined or were unfit for operation. The action of eunatrol is, we presume, like that of olive-oil.

Belladonna has been said to have a specific action in cholelithiasis, and it is readily conceivable that if a small concretion were passing along the ducts, by its specific action on involuntary muscular fibre this drug might aid in its expulsion. But we cannot agree with a medical writer

* *British Medical Journal*, January 30, 1892.

who says that a pill containing a quarter of a grain of extract of belladonna and a quarter of a grain of podophyllin resin is a remedy as nearly approaching a specific as it is possible to obtain.

Massage found a strong advocate in the late Dr. George Harley, who said: 'For, without doubt, perseverance and opportunity will in the end enable them (the operators) to discover gall-bladders equally as readily as the trained fingers of the expert do, and that, too, even through abdominal parietes so thick that the untrained hands cannot do so much as make out the boundary of the solid liver through them. While, again, they will ultimately find that they will be able to extrude small impacted biliary concretions, be they in the shape of sand, gravel, or stones from the bile-ducts into the duodenum with as much safety and certainty as they can pass a catheter through a stricture into a human urinary bladder. At the same time, for the sake of the patient's welfare, as well as their own reputation, they must never forget to be as careful in the mode of operative procedure in the one case as in the other, as neither operation is invariably unattended with danger. This is especially the case when the manipulative operation has been unfortunately delayed until the gall-stones have grown large and hard, and, on account of the prolonged pressure, begun to ulcerate through the tissues they have long pressed against.'

It is scarcely necessary to do more than draw attention to the description of the gall-stones at the beginning of this chapter in order to point out how futile—nay, more, how injurious—massage must be in many cases, however skilfully performed; for not only is it unlikely, but, in by far the greater number of cases, it is utterly impossible that the concretions can be forced through passages as narrow as we know the cystic and common ducts to be.

We can only say that were we the subjects of cholelithiasis we would not submit to massage, nor could we conscientiously recommend it to others. Although it may aid the expulsion of small calculi, it is impossible to diagnose the absence of large ones, or to know the exact condition of the ducts, which may possibly be ruptured by manipulation.

During a gall-stone attack relief is urgently demanded. At times the drinking of a pint of water as hot as it can be taken, especially if combined with the application of hot fomentations over the region of the liver, will assuage the pain; at other times the administration of 30 drops of spiritus etheris in 2 teaspoonfuls of choloroform-water every quarter of an hour will answer the same purpose. In some cases exalgine, in 1-grain doses, dissolved in a teaspoonful of hot water and repeated every half-hour for three or four doses, may prove of service. In many cases, however, the only satisfactory remedy is a morphia injection.

Surgical Treatment.

After medical treatment has been fairly and fully tried and failed, all are now agreed that surgical measures should be resorted to.

While cholecystotomy is generally recognised as the operation to be aimed at in the treatment of affections of the gall-bladder or bile-duct, especially in cholelithiasis, it is often impossible to say what operation will have to be done until the abdomen is opened.

The indications for operating would seem to be as follows :

1. In frequently-recurring biliary colic without jaundice, with or without enlargement of the gall-bladder.
2. In enlargement of the gall-bladder without jaundice, even if unaccompanied by great pain.
3. In persistent jaundice ushered in by pain, and where recurring pains, with or without ague-like paroxysms, render it probable that the cause is gall-stones in the common duct.
4. In empyema of the gall-bladder.
5. In peritonitis, starting in the right hypochondrium.
6. In abcess around the gall-bladder or bile-ducts, whether in the liver, or under, or over it.
7. In some cases where, although gall-stones may have passed, adhesions remain and prove a source of pain and illness.
8. In fistula, mucous, muco-purulent or biliary.
9. In certain cases of chronic jaundice, with distended gall-bladder dependent on some obstruction in the common

duct, although the suspicion of malignancy be entertained. In such cases the increased risk must be borne in mind, as malignant disease may be the cause of the obstruction, and operation in such cases is attended with greater danger than ordinary.

10. In phlegmonous cholecystitis and in gangrene, if the case be seen and recognised at a sufficiently early stage of the disease.

11. In gunshot injury or in stab wounds over the region of the gall-bladder.

12. In suspected rupture of the gall-bladder without external wound.

13. In some cases of chronic catarrh of the gall-bladder or bile-ducts.

14. In infective and in suppurative cholangitis.

Of the operative measures undertaken for diagnosis, sounding and aspiration of the gall bladder must be referred to. The so-called 'sounding for gall-stones,' either by means of a probe passed through a canula, or by the fine needle of an aspirator, is both uncertain and dangerous, and may more safely be replaced by a small exploratory incision, which can be extended for treatment if required. If the patient be thought too feeble to bear a general anæsthetic, this operation may be done under cocaine.

Aspiration of a distended gall-bladder through the unopened abdomen, though apparently a simple procedure, is not unattended with danger, death having followed in more than one instance. Murphy says it is fatal in 25 per cent. It is only in very exceptional cases that it can do any good.

It is infinitely preferable to make a small exploratory incision, then to empty the gall-bladder by the aspirator, and afterwards to explore the bile-passages with the fingers. If, however, aspiration without exploration be decided on, a small needle should be used, and the cyst emptied as far as possible, in order that intra-cystic tension may not lead to extravasation through the needle puncture.

Since in the majority of cases an operation for gall-stones is in the first place simply exploratory, the actual operation on the gall-bladder or bile-ducts being only determined by

the conditions found when the abdomen is opened, it may be well for us first to consider a simple abdominal section in the gall-bladder region.

Position of Patient.

It has been proposed to suspend the upper part of the trunk when the patient is on the operating-table, by straps placed under the armpits, in order to allow the intestines to fall away from the liver, and thus to afford a better view of the parts to be operated on, just as the Trendelenberg position does in the case of the pelvic organs; but as this is inconvenient, and as a rule impracticable, it is worth considering whether we can in any way modify it. It will be found that a narrow firm sand-bag covered with flannel, placed at the liver level on the operating-table under the back, which is thus arched over it, will do all that is required, as it brings the common duct from 2 to 3 inches nearer the surface, opens out the costal angle, and tends to make the intestines slip down from the liver.

Though this method does not seem to have been used much by others, we, from ample experience, can speak well of its utility.

Incision.

A vertical incision in the right semilunar line is the one most frequently resorted to, but it is better where practicable to go through the rectus, thus avoiding the division of muscle fibres, and giving a stronger scar. If there be a perceptible tumour, it is well to make the incision over the most prominent part; if there be no tumour, but an enlarged liver, the upper end of the incision will have to commence at the hepatic margin. If, however, as is so often the case, there be neither tumour nor enlargement of the liver, the incision will be from the ninth costal cartilage, vertically downward for 3 inches.

The aponeurosis in the semilunar line may be divided, but, as a rule, the fibres of the rectus may be separated, and the anterior and posterior layers of the rectus sheath will then be separately cut. If more room be required, it can be

obtained either by extending the vertical incision or adding a transverse one, either internal or external to the vertical line, in whichever direction it may seem advisable. It is desirable to avoid, as much as possible, dividing muscular fibres, as they retract and can only with difficulty be approximated in suturing the wound. Another great advantage in the vertical incision is the avoidance of vessels and nerves.

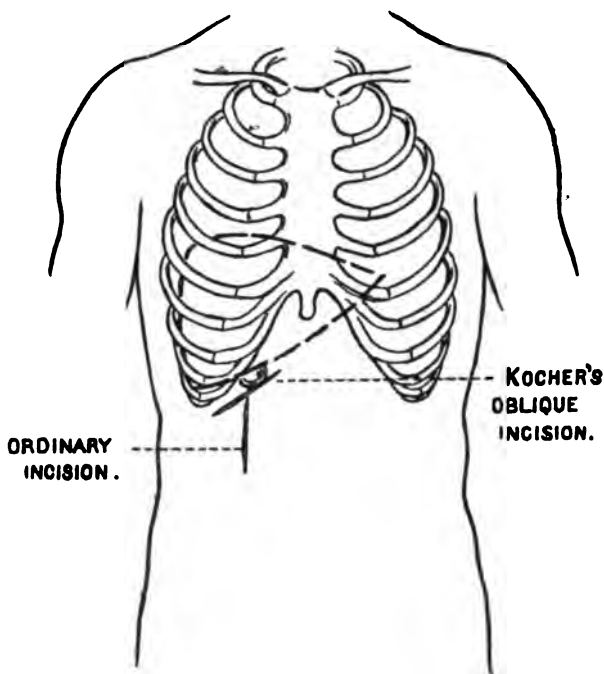


FIG. 44.—DIAGRAM TO SHOW INCISIONS.

The transversalis fascia and peritoneum are best divided together, without separating them, as together they form a strong membrane, whereas singly they are too weak to hold stitches if there be much tension.

Kocher employs an oblique incision parallel to the right costal margin (Fig. 44), which of necessity divides muscles and nerves, but which exposes the parts freely, as the wound at once gapes widely.

Although for cholecystotomy the transverse or oblique

incision is quite unnecessary, and usually inadvisable, where it is necessary to expose or manipulate the common duct it presents the advantages of better exposure and more efficient drainage, though for drainage of the right renal pouch a stab wound in the loin is both simple and efficient.

The lumbar incision, which has been suggested in order to reach the common duct without opening the peritoneum, is useful only in theory, and is surrounded by so many difficulties as to make it quite impracticable.

Arrest of Hæmorrhage.

As a rule, pressure forceps and an occasional ligature effect all that is desirable or necessary; but in cases of long-standing jaundice, especially if accompanied by malignant disease, additional precautions are advisable on account of the tendency to hæmorrhage.

In order to avert this danger in deeply-jaundiced patients, we have found the administration of chloride of calcium, in 30-grain doses every four hours for a few days before operation, to make the blood more plastic and to lessen the tendency to bleeding, both at the time of operation and subsequently.

For this therapeutic measure we are indebted to Dr. A. E. Wright, whose researches on the 'Coagulability of the Blood,' published in the *British Medical Journal* for December 19, 1891, are well worthy of study. After operation, the drug may be continued either by the mouth or by nutrient enema for some time with advantage. In jaundiced cases it is preferable to ligature all bleeding-points, rather than to trust to pressure forceps for hæmostasis.

In order to remove the danger of ventral hernia, the abdominal wall should be sutured layer by layer, employing chromic carbolized catgut for the deep, and silkworm gut for the superficial, sutures; but if the operations have been very prolonged, and the patient be suffering from shock, it may be advisable to suture the parietes *en masse*, using silk of medium thickness, and passing the sutures from within outward at intervals of half an inch. Where it is considered wise to employ gauze packing, it is well to apply the sutures

and to leave them long, so as to be able to draw the edges of the wound together after the tampon has been removed, without putting the patient to the inconvenience of inserting stitches later.

The preliminary preparation and the after-treatment of these cases differs in no respect from that of abdominal section in general.

Cholecystotomy or cholecystostomy usually follows on exploration, as it is unquestionably the operation *par excellence* in the treatment of gall-stones.

The indications for the operation are :

1. In all cases where the gall-bladder is sufficiently large to permit of drainage, after gall-stones have been removed from the gall-bladder or ducts.

2. In cases where there are gall-stones in the ducts, but the patient is too ill to bear a prolonged operation, the gall-stones being deliberately left for treatment by some solvent solution.

3. In empyema of the gall-bladder, where that viscus is not too much disorganized to be permitted to remain.

4. In certain cases of chronic catarrh of the gall-bladder or bile-ducts.

5. In infective and in suppurative cholangitis.

6. In obstruction of the ducts due to hydatid disease.

7. In dropsy of the gall-bladder.

8. In idiopathic rupture, or laceration, or gunshot injury of the gall-bladder or ducts.

9. In cases of choledochotomy, in order to avoid tension in the sutured duct.

10. In certain cases of obstructive jaundice dependent on malignant tumour, which is occluding the ducts ; but in these cases the increased danger must be borne in mind.

11. In some cases of phlegmonous cholecystitis or gangrene, where the patient is too ill to bear cholecystectomy.

Technique of Cholecystotomy.

If the gall-bladder be found distended, it is aspirated and then opened, the parts being isolated by thin flat sponges.

If, as is often the case, the gall-bladder be small and

atrophied, it will probably be surrounded by adhesions, which require careful separation, which can for the most part be better done by touch than sight. If the operation has been undertaken for gall-stones, they are removed by means of forceps passed through the opening in the gall-bladder, or better still by a scoop: if they be small, they are removed whole; if large, they may be directly needled, or crushed and removed in fragments.

After the gall-bladder has been cleared, the fingers of the right hand are passed along the outside of the ducts, when, if there be any other concretions, they can as a rule be felt, and if possible they should be manipulated backward into the gall-bladder, from which they can be removed. If this be impracticable without undue force, cholelithotripsy or choledochotomy may be necessary. These operations will be considered later.

Supposing the bile-passages to have been cleared, or for some reason further manipulations are considered inadvisable, a non-perforated rubber drainage-tube is inserted into the gall-bladder, and the edges of the incision in it are brought up and sutured by fine chromic catgut to the aponeurotic layer of the abdominal wall, not to the skin, thus avoiding the danger of fistula, as between the opening in the gall-bladder and the skin is a considerable thickness of tissue, which soon becomes covered with granulations, and their contraction in healing secures closure.

If this method be adopted there need be no fear of a fistula following cholecystotomy, if the ducts have been cleared. Where there is time, it is better to suture the peritoneum of the gall-bladder to the parietal peritoneum and the mucous margin to the aponeurosis, thus more completely shutting out the peritoneal cavity. The remainder of the parietal incision is closed as described under simple exploratory incision.

In ordinary simple cases the drainage-tube is shortened on the second or third day, and removed on the fourth or fifth; but if there have been much cholecystitis or cholangitis, it is better to drain for a week, or even longer. Dr. Terrier, in operating for suppurative cholangitis, suggests that the discharge should be bacteriologically tested from

time to time, and that the tube should not be removed until the bile is sterile or nearly so, for at first it is loaded with organisms, and if all goes well these diminish, and finally disappear.

The tube may be either cut off close to the surface, or brought through the dressings into a receptacle placed by the side of the patient. The latter method saves frequent dressings, which are otherwise necessary when the discharge is free.

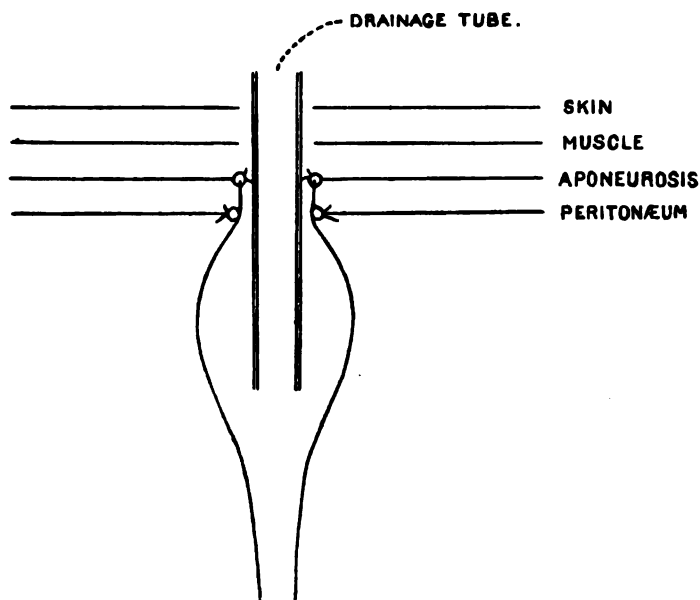


FIG. 45.—DIAGRAM TO ILLUSTRATE MODE OF SUTURE IN CHOLECYSTOTOMY.

This description applies to the ordinary operation on a gall-bladder of ordinary size, or to one distended; but in the case of a contracted gall-bladder situated deeply, the operation may be both prolonged and difficult. Where unable to bring up the gall-bladder, it has at times been possible to tuck down the parietal peritoneum to the edges of the gall-bladder opening and so to effect suture of the contiguous margins; but in several cases where this could not be done the right border of the omentum has been sutured to the

margin of the gall-bladder opening and to the parietal peritoneum, thus forming a tube of peritoneum around the drainage-tube, and shutting out the general peritoneal cavity. This method has also since been efficiently employed by Mr. Arthur Barker. Where occlusion in this way cannot be effected, the insertion of a drainage-tube into the gall-bladder, without suture of the margins to the parietes, seems to be efficient, for it is, on account of intra-abdominal tension, easier for the bile to pass away directly through the tube than to enter the abdomen, and it is probable that within from twenty-four to forty-eight hours plastic peritonitis shuts out the drainage track from the general peritoneal cavity.

Where the gall-bladder is small and deeply placed, the tube may be inserted in it and a running catgut suture applied round the margin of the incision in the gall-bladder, so that when tightened it draws the edges of the incision closely around the tube; the same suture may then be passed through the tube and tied so as to fix it in position and prevent it slipping, until the catgut softens in about a week or ten days, when the tube can be safely removed. The method of gauze packing is also a safe means of shutting off the peritoneal cavity.

Mr. Knowsley Thornton suggested suprapubic drainage in cases where occlusion of the bile-channels is doubtful; but if drainage of the abdominal cavity is required in such cases, it can be done better either by means of a tube passed into the right kidney pouch and brought out at the lower end of the original incision, or through a stab puncture in the right loin.

Dr. Murphy has invented a 'button tube' for use in cases where the gall-bladder is contracted and cannot be brought to the surface; but in practice it will usually be found that the contracted gall-bladder is too small to permit of its employment.

In certain cases where the gall-bladder is contracted, after opening and clearing it and the ducts, the incision may be immediately closed by suture, the line of incision being isolated by a gauze drain; or in other cases cholecyst-

ectomy may be performed, and the cystic duct ligatured, the gauze drain being again employed; or, as suggested by Morison, the incision in the gall-bladder may be deliberately left patent, and the bile allowed to run into the right kidney pouch, from which it is removed by a drainage-tube in the loin.

The operation of cholecystotomy has been modified in several ways; for instance, the opening has been closed and then fixed to the abdominal incision, which has been closed over it; this operation is known as cholecystendysis (Courvoisier).

It can only be of use where the ducts are known to be thoroughly cleared, where there is no fear of subsequent stricture, and where there is no catarrh or inflammation of the bladder or bile-passages. In Case 116 it was employed for the cure of a biliary fistula.

The so-called 'ideal' operation suggested by Langenbach,* in which the opening in the gall-bladder is sutured, and the viscus returned without fixing it to the surface, has been thought by Lange, Meredith, Kuster, Keen, and others, to be attended with greater risk than the operation of cholecystostomy. If it be thought advisable to adopt this method, it is necessary to prove that the ducts are clear, and this may be accomplished by distending the gall-bladder with warm sterilized water, and then forcing it through the ducts, or by catheterism of the ducts, as advocated by Drs. Terrier and Dalby.† Of these methods the former is to be preferred, both on account of its safety and efficiency.

Recently reported cases of 'ideal' cholecystotomy would seem to prove that the dangers at first attending the operation may be overcome by a proper selection of cases, and by carefully suturing the mucous, muscular, and serous margins separately; but the serious objection to it is that the benefits of drainage are not obtained, as in the ordinary operation of cholecystotomy.

A real use for this modification is found in cases where it has been necessary to open a contracted gall-bladder, but

* *Centralbl. für Chirurgie*, 1887.

† *Revue de Chirurgie*.

where, on account of the depth, it is found impracticable to bring it to the surface, as also when, from the contraction of its cavity, it is found impossible to insert a drainage-tube. Under such circumstances, sutures can readily be applied by means of a rectangular cleft-palate needle, or by Mr. Lane's needle-holder. The line of suture is made secure against dangerous leakage by the gauze drain, the lower end of which is packed moderately firmly over the gall-bladder.

Another modification suggested by Bloch is that in two stages. The operation consists in incising the parietes until the peritoneum is reached, the cavity of which, however, is not opened; the wound is then packed with gauze, and left for several days, when adhesions will have formed between the gall-bladder and the parietal peritoneum. The gall-bladder can then be safely opened. Or if the peritoneum be opened, the gall-bladder is fixed, but not opened until adhesions have formed.

As the method is only available for the simplest cases, viz., where the gall-bladder is distended, as it does away with all chance of exploring the ducts by the hand within the abdomen, and as it is frequently followed by fistula, it needs only to be mentioned to be condemned as clumsy and uncertain, and no safer than the ordinary operation of cholecystotomy.

To this opinion there may be one exception: the operation *à deux temps* presents considerable advantages when cholecystotomy is being undertaken in the presence of chronic jaundice associated with distended gall-bladder, as in such cases there is usually malignant disease either of the head of the pancreas or of the bile-ducts, and when the peritoneum is exposed but not opened, pressure can be applied to arrest the oozing of blood, which cannot always be stopped by ligatures or forceps. Bloch, however, in his original papers, and again in the *Revue de Chirurgie* for 1895, does not recommend the operation for this reason, but on account of the fear of septic contamination of the peritoneum, which ample experience proves to be groundless.

Délagenière* exposes the gall-bladder, and raises the edge

* *British Medical Journal* Supplement, May 6, 1899.

of the liver as high as possible with a retractor. Then the peritoneum is guarded with a compressor or sponge, and the fundus of the gall-bladder opened. The incision is enlarged with scissors along the left aspect of the gall-bladder till the calculi to be removed are reached. A Kocher's forceps is placed on each side of the incision; the two will draw the deeper parts well towards the abdominal wall. The duct may be cut open almost to its termination in a bad case. When the calculi are extracted, he closes the long incision in the duct and gall-bladder with a continuous silk suture, and applies an external layer of interrupted sutures. To establish a biliary fistula, about half an inch of the incision at the fundus is left open. The peritoneum is then sutured all round this opening in the usual manner. A hole is then made in the right rectus muscle, and the free piece of the wall of the gall-bladder drawn into it, the edges of the opening being stitched to the edges of the hole in the muscle. Another buttonhole is made in the skin over the hole in the rectus, and through this a drainage-tube is passed into the gall-bladder. The original abdominal incision is then closed.

The *statistics* of cholecystotomy vary very considerably in different hands. As in ovariectomy, experience leads to greater success, and those who have done a considerable number of operations will, as a rule, show the best results.

Out of the 196 cholecystotomies reported below, there were eleven deaths, five being the subject of cancer, and four of infective cholangitis with jaundice. The deaths which occurred in 'simple' cases were those of an old gentleman aged sixty-six who had mitral disease, with evidence for some months of failure of compensation, and in whom operation was only performed at his urgent request, since his sufferings were such as to induce him to undertake the special risk, and of an old man of sixty-two who made apparently a good recovery from operation, but developed cerebral symptoms and died on the thirty-fourth day.

The total mortality, even including malignant cases, was 5.5 per cent., but only 1.2 in uncomplicated cholelithiasis.

Murphy of Chicago, at the Roman International Medical

Congress, collected 201 cases of cholecystotomy, the mortality being 19 per cent.

Courvoisier gives the statistics, up to 1890, of 104 cases, the mortality being 21·14 per cent., and 16 per cent. had fistulæ. Of thirty-one cases operated on in two stages, the mortality was only 12·5 per cent., but 34 per cent. were left with a fistula.

Martig, up to 1893, gave the mortality as 17 per cent., with a fistula remaining in 20 per cent.; for the operation *à deux temps* he gives a mortality of 10 per cent.

Délagenière, in 1890, collected ninety-nine cases with seventeen deaths, a mortality of 17 per cent.

Kehr, Halberstadt,* gives the result of 209 operations on the gall-bladder and bile-ducts, in 174 different patients. Of his simple cholecystotomies, there was barely 1 per cent. of deaths; but of his complicated ones the mortality was 58·8 per cent., or a loss of ten out of seventeen cases, making the all-round mortality a little over 6 per cent. In a later series† he reports 202 operations, with a mortality of thirty-two (16 per cent.), and attributes the higher mortality to the increased gravity of the cases. In conservative operations on the gall-bladder he lost three patients out of sixty-eight operations, *i.e.*, a mortality of 4·4 per cent.

Greig Smith reported eleven simple cases without a death, and one complicated case which died, equivalent to 8·33 per cent. Lawson Tait published fifty-five cases with three deaths, showing a mortality of 5·4 per cent.

With regard to recurrence, if the ducts be cleared and the gall-bladder drained, relapse is rare.

An eminent operator recently said that he found fistula frequently followed on cholecystotomy, which, however, is quite at variance with our experience since adopting the modification of suturing the edge of the gall-bladder incision to the aponeurosis and not to the skin, which distinctly proves that fistula will only follow under such circumstances if the ducts have not been cleared, and then it is better that there should be such a safety-valve, which can be remedied by a further operation.

* *Berlin Klin. Woch.*, June 15, 1896.

† *Langenbeck's Archives*, vol. lviii, p. 3.

Out of the 189 cholecystotomies recorded in the tables below, fistula occurred in fourteen cases. In the first ten there were five fistulæ; these were all operated on by stitching the gall-bladder to the skin, as proposed by Lawson Tait. In the last 179 cases, where the opening in the gall-bladder was sutured to the aponeurosis, and not to the skin, there were only nine fistulæ, which were treated by further clearing the ducts or short-circuiting the obstruction.

As one would expect, cholecystotomy *à deux temps* is often followed by fistula. Martig gives 20 per cent., and Courvoisier 34 per cent., which, of course, are due to imperfect clearing of the ducts.

After cholecystotomy has been performed, and the gall-bladder cleared of its contents, it may be found impracticable to remove other gall-stones impacted in the cystic or common ducts, either by means of forceps or scoop introduced through the gall-bladder incision, or by digital manipulation from without.

Under such circumstances, the gall-stones may be crushed or removed by choledochotomy, or under certain circumstances cholecystenterostomy may be performed. As crushing is the least severe procedure, and as we have had considerable and favourable experience of it, that operation will be first described.

CASES OF CHOLECYSTOTOMY.
(4) CASES OF CHOLECYSTOTOMY IN SIMPLE CASES.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
1	21-6-84	B. F. 33 F.	Cholecystotomy	Distended gall-bladder; 12 gall-stones removed	R.	Small mucous fistula. In good health, 1897	Mr. Wheelhouse
2	20-7-85	L. S. 22 F.	Cholecystotomy	Distended gall-bladder; 60 gall-stones removed	"	Mucous fistula for a time; cured by cholecystectomy. In good health, 1895	Dr. Churton
3	14-1-88	V. B. 42 F.	Cholecystotomy	Empyema of gall-bladder. Cause, gall-stones	"	Biliary fistula for a time. Ultimately quite well, and in good health, 1892	Dr. Loe
4	19-3-88	E. C. 44 F.	Cholecystotomy	14 gall-stones removed	"	Cured	Infirmary
5	2-5-88	H. F. 32 F.	Cholecystotomy	42 gall-stones removed	"	Cured	Infirmary
7	15-6-88	S. T. 31 F.	Cholecystotomy and cholelithotripsy	Tumour of gall-bladder, 2 years. One large gall-stone removed from gall-bladder. One crushed in cystic duct	"	Recovery	Infirmary
8	9-7-88	E. J. 40 F.	Cholecystotomy	Distended gall-bladder; 2 large gall-stones removed	"	Complete recovery	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
9	29-7-88	A. H. 42 F.	Cholecystotomy	Slight jaundice; 2 large gall-stones removed—one from gall-bladder, and one from junction of cystic and common duct	R.	Cure. Well 3 years after	Dr. A. Atkinson
10	29-8-88	S. G. 49 F.	Cholecystotomy	66 gall-stones removed	"	Complete recovery for a time, but ultimately developed stricture of cystic duct, and required cholecystectomy. See Case 22	Dr. Horne, Barnsley
14	28-3-89	C. 41 M.	Cholecystotomy	Distended gall-bladder; 14 gall-stones removed	"	Cured	Infirmary
15	2-5-89	H. 32 F.	Cholecystotomy	Distended gall-bladder; 42 gall-stones removed	"	Cured	Dr. Clifford Allbutt and Mr. Wheelhouse
16	7-9-89	H. 55 M.	Cholecystotomy	70 gall-stones removed. Jaundice	"	Quite well, 1897	Dr. Black, Harrogate
17	26-9-89	A. W. 41 F.	Cholecystotomy	3 gall-stones removed	"	When last heard of well	Dr. Swann, Batley
18	10-10-89	F. 34 F.	Cholecystotomy	12 gall-stones removed. Shrunken gall-bladder. Jaundice present	"	Quite well when last seen, 1896. See Case 37	Dr. G. Coleman, Hemsworth

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
19	16-1-90	H. 32 F.	Cholecystotomy	Distended gall-bladder; 2 gall-stones removed	R.	Quite well when last seen	Dr. Fairbank, Doncaster
20	14-2-90	G. T. 42 F.	Cholecystotomy	1 large gall-stone removed	"	Quite well when last seen	Infirmary
21	5-5-90	R. 50 M.	Cholecystotomy	1 large gall-stone removed	"	Quite well when last seen, 1897	Dr. Britton, Harrogate
23	3-6-90	C. 30 F.	Cholecystotomy and cholelithotripsy	Jaundice; several stones crushed in common duct	"	Well, 1894	Dr. Dobson
24	19-6-90	B. B. 29 M.	Cholecystotomy	6 gall-stones removed. Shrunken gall- bladder	"	Cure. Well, 1892.	Dr. Dearden, Wyke
29	1-11-90	H. 30 F.	Cholecystotomy and cholelithotripsy	1 gall-stone removed, several crushed in ducts. Jaundice present	"	Quite well some months after	Dr. Squance, Sunderland
32	29-12-90	R. 39 M.	Cholecystotomy and cholelithotripsy	Numerous gall-stones removed	"	Rapid recovery. Returned to America within month. Well, 1893	Mr. Wheelhouse
34	13-1-91	E. W. 55 F.	Cholecystotomy and cholelithotripsy	Gall-stones crushed in cystic duct. Slight jaundice	"	Cured	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
37	26-2-91	F. 35 F.	Cholecystotomy and cholelithotripsy	Stones crushed in common duct. Jaundice present	R.	Well, 1896	Dr. Coleman
39	12-3-91	B. S. 40 F.	Cholecystotomy and cholelithotripsy	25 gall-stones removed and 2 crushed in common duct. Jaundice	"	Cured	Dr. Oglesby, York
41	23-3-91	H. 32 F.	Cholecystotomy and cholelithotripsy	1 gall-stone removed. Gall-bladder contracted. Numerous adhesions	"	Cured. Well, 1894	Dr. Braithwaite
44	7-5-91	E. S. 50 F.	Cholecystotomy and cholelithotripsy	5 stones crushed with fingers and forceps	"	Apparent cure	Infirmary
45	5-12-91	M. 59 F.	Cholecystotomy	Distended gall-bladder; movable right kidney. Chronic catarrh	"	Good recovery. July, 1893. no recurrence of symptoms	Dr. Dobie, Keighley
48	12-2-92	H. C. 44 F.	Cholecystotomy	8 gall-stones removed from gall-bladder, 15 from cystic duct	"	Cured	Dr. Stewart, Batley
49	3-3-92	J. O. 51 M.	Cholecystotomy and cholelithotripsy	Gall-stones crushed in cystic duct. Jaundice present	"	Cured	Dr. McGregor, Huddersfield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
50	10-3-92	A. M. 37 M.	Cholecystotomy and cholelithotripsy	Jaundice. Gall-stones removed from gall-bladder and cystic duct	R.	Biliary fistula persisted for a time, but ultimately closed, to re-open after another attack of biliary colic followed by jaundice. See Case 55	Infirmary
56	15-6-92	R. 56 F.	Cholecystotomy and cholelithotripsy	Gall-stones in bladder and in cystic and common ducts; latter crushed, former removed	"	Cured	Dr. Blomfield, Pontefract
58	12-1-93	L. P. 40 F.	Cholecystotomy and cholelithotripsy	6 gall-stones from cystic duct; several crushed in common duct	"	Small biliary fistula persisted, but at times closed. See Case 73	Infirmary
60	24-2-93	B. 36 F.	Cholecystotomy	6 large gall-stones removed	"	Cured. Well, 1896	Dr. Watts, Dewsbury
61	3-3-93	J. O. 51 M.	Cholecystotomy and cholelithotripsy	Contracted gall-bladder; several stones crushed in common duct. Jaundice	"	Recovery complete. Quite well, 1894	Infirmary
62	11-3-93	A. B. 37 F.	Cholecystotomy	Shrunken gall-bladder; 1 large stone in cystic duct removed	"	Cured. Well when last seen	Infirmary
64	11-4-93	H. 50 M.	Cholecystotomy	156 gall-stones removed from gall-bladder and cystic duct	"	Cured	Dr. Topham, Halifax

No	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
67	6-5-93	E. B. 44 F.	Cholecystotomy	Contracted gall-bladder; 2 stones in cystic duct; crushed	R.	Well when last heard of	Infirmary
68	19-5-93	H. G. 40 F.	Cholecystotomy	Gall-stone, weighing 112 grs., removed from cystic duct	"	Perfectly well some months subsequently	Infirmary
69	19-5-93	S. J. R. 35 F.	Cholecystotomy	2 large gall-stones in cystic duct and common duct. Gall-bladder contracted	"	Cured. Well in 1895	Dr. Taylor, Meadow Lane
70	25-5-93	P. S. 31 F.	Cholecystotomy	Stone crushed in common duct. Jaundice	"	Quite well when seen some time after	Dr. Scatterry, Keighley
71	6-6-93	F. 54 F.	Cholecystotomy	Distended gall-bladder; 3 stones removed from cystic duct	"	Quite well, 1894	Dr. Rowe, Leeds, and Dr. Mais, Thornor
72	20-6-93	B. B. 58 M.	Cholecystotomy and cholelithotomy	Several large stones in cystic and common ducts removed; others crushed. Jaundice	"	Bronchitis third week, and patient left the infirmary at his own request, though not well	Infirmary
74	24-8-93	J. G. 52 M.	Cholecystotomy	Large stone in cystic duct; several in common duct crushed. Jaundice	"	Quite well, 1894	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
75	4-9-93	C. 35 F.	Cholecystotomy	27 gall-stones removed from gall-bladder and cystic duct. jaundice	R.	Well, 1896	Dr. Mackenzie, Douglas, Isle of Man
76	26-9-93	B. 40 F.	Cholecystotomy	Distended gall-bladder; 6 stones removed from gall-bladder and cystic duct. Slight jaundice	"	Perfectly well, February, 1895	Dr. Hodgson Wright, Halifax, and Dr. Ozanne, Harrogate
77	28-9-93	K. B. 44 F.	Cholecystotomy and cholelithotripsy	Stones removed from cystic duct and several crushed before removal; extensive adhesions. jaundice	"	Well when last heard of	Infirmary
78	21-10-93	E. R. 56 M.	Cholecystotomy and cholelithotripsy	6 gall-stones removed and several crushed in common duct. jaundice	"	Cured. Well some months after	Infirmary
79	14-11-93	C. 35 F.	Cholecystotomy	Sinus discharging at umbilicus; 18 gall-stones removed from gall-bladder, together with pus and mucus	"	March, 1894, writes to say very well	Dr. Walker, Redcar
80	30-11-93	M.A.K. 30 F.	Cholecystotomy and cholelithotripsy	5 gall-stones removed	"	Cured	Infirmary
83	18-2-94	H. C. 45 F.	Cholecystotomy	6 gall-stones in gall-bladder, and 23 in cystic duct	"	March, 1894, writes to say 'better than for years'	

No.	Date.	Initials, Age, Sex.	Operati- on.	Description.	Re- sult.	After-History.	With whom seen.
84	20-2-94	M.L.S. 30 F.	Cholecystotomy	Distended gall-bladder, with attacks of pain; gall-stones removed	R.	Recovery	Infirmary
85	3-3-94	L. 32 F.	Cholecystotomy	20 gall-stones removed from gall-bladder and cystic duct. No jaundice	"	Well, 1897	Dr. McGregor Young
86	7-3-94	E. 35 F.	Cholecystotomy	Distended gall-bladder; 35 gall-stones removed. No jaundice	"	Well, 1897	
89	24-5-94	S. 50 M.	Cholecystotomy	'Spasms' for three years; 96 gall-stones removed from gall-bladder and cystic duct; drainage 4 days	"	Well, 1897	Dr. Eddison, Leeds, and Dr. Swann, Batley
90	29-5-94	L. 39 F.	Cholecystotomy	10 years' history; no jaundice; hour-glass contraction of gall-bladder; 49 gall-stones removed; drainage	"	Cured. Well, 1896	Dr. Helm, Sheffield
93	18-6-94	S.P. 43 F.	Cholecystotomy	'Spasms' 10 months; jaundice; emaciated and extremely weak. 160 stones, size of peas, removed from gall-bladder and cystic duct. Adhesions. Drainage. Jaundice	"	Cured	Infirmary
94	19-7-94	S.A. 40 F.	Cholecystotomy	160 gall-stones removed	"	Recovery	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
95	10-8-94	W. R. 37 M.	Cholecystotomy and cholelithotomy	Admitted for biliary fistula following on cholecystotomy, performed at Wolverhampton some months before, when 10 gall-stones were removed. Catheterism and syringing ducts having failed, cholelithotomy was performed, and 2 stones crushed in the common duct	R.	Cured	Infirmary, Dr. Deansley
96	18-8-94	V. 60 M.	Cholecystotomy	30 gall-stones removed from cavity in liver. Ulceration into duodenum. Jaundice	"	Some months after, died from cancer of liver	Dr. Carter, Ilkley
97	6-9-94	W. 34 F.	Cholecystotomy, with separation of adhesions	Extensive adhesions of gall-bladder to omentum and stomach. Gall-bladder filled with thick mucus and bile Chronic cholecystitis. No gall-stones. Drainage	"	Well when heard of in 1896	Dr. Byers and Dr. Steen, Belfast
100	23-10-94	T. 36 F.	Cholecystotomy	8 oz. milky fluid removed from gall-bladder. 3 stones the size of nutmegs from cystic duct. Drainage 3 days	"	Complete recovery, and gained nearly a stone in weight in a month. Well, 1896	Dr. Tweedy, Northallerton
101	10-11-94	G. 60 F.	Cholecystotomy	Spasmodic intermittent pain. Gall-bladder filled with mucus and bile. Chronic cholecystitis. Drainage	"	Cured. Quite well in 1896	Dr. Clifton, Sheffield
102	2-12-94	F. C. C. M.	Cholecystotomy	Gall-stones removed	"	Recovery	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
104	8-1-95	H. P. 55 M.	Cholecystotomy and choledithority	History of attacks, 8 years. Jaundice at times, 11 stones removed; several crushed in the common duct; drainage of gall-bladder	R.	Relief. Fistula persisting. Infirmary See Case 121	Infirmary
105	13-2-95	S. J. 50 M.	Cholecystotomy	1st attack 12 years ago; no tumour felt; had passed 8 stones at various times; 5 stones removed. Drainage	"	Cured	Infirmary
106	8-3-95	C. 50 M.	Cholecystotomy	Empyema of gall-bladder. No jaundice. 16 gall-stones removed from gall-bladder and cystic duct. 2 oz. of muco-pus in gall-bladder. Drainage 4 days	"	Returned home well in 3 weeks. Well, 1897	Dr. Husband, Ripon
107	14-3-95	C. 51 M.	Cholecystotomy	Slight jaundice. 720 gall-stones removed. Drainage 7 days	"	Cured. Well, 1897	Dr. Fairburn, Doncaster
108	20-3-95	J. K. D. 44 M.	Cholecystotomy	History, 2 years with jaundice. Large stone removed from cystic duct	"	Cured	Infirmary
109	18-4-95	C. 37 F.	Cholecystotomy	Gall-stones removed from cystic duct	"	Recovered. Well, 1897	Dr. Legh de Legh, Redcar
110	11-4-95	H. P. 55 F.	Cholecystotomy	One large gall-stone removed, size of cherry	"	Well, 1896	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
112	15-5-95	A. B. 41 F.	Cholecystotomy	Attacks with jaundice for 11 years. 43 stones removed, 6 the size of cherries	R. Cured		Infirmary
113	20-5-95	G. 45 F.	Cholecystotomy and cholelithotri- ty	8 gall-stones removed from cystic duct; several crushed in common and hepatic ducts. Drainage	"	Completely cured, 1897	Dr. Meade, Bradford
114	27-5-95	A. S. 35 M.	Cholecystotomy	Attacks for 10 years; passed 14 stones. 397 small and 5 large stones re- moved	"	Cured. Well, 1896	Infirmary
116	3-7-95	S. C. 36 F.	Cholecystotomy & cholecystendysis	Had biliary fistula following operation at another hospital, when 18 stones were removed. Gall-bladder de- tached, edges inverted and sutured	"	Cured	Dr. Salter, Scarborough
117	4-7-95	E.M.D. 41 F.	Cholecystotomy	Single severe attack 7 months ago. Numerous seizures since. One large stone removed; adhesions	"	Cured	Dr. Rowe
120	23-7-95	W. 42 M.	Cholecystotomy and cholelithotri- ty	Never jaundiced; one large stone in cystic duct which was crushed. Drainage	"	Recovered. Well, 1897	Dr. Sproule, Mirfield
124	10-9-95	J. C. F. 35 F.	Cholecystotomy	10 years' history, with intermittent jaundice; 30 stones removed; ad- hesions broken down	"	Cured. Well, 1897	Mr. H. B. Hewet- son

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
128	28-11-95	T. M. 43 M.	Cholecystotomy	48 stones removed. Jaundice	R.	Cured	Infirmary
129	3-12-95	J. M. 32 F.	Cholecystotomy	Attacks with jaundice for 8 years. After each attack passed 4 or 5 stones. Gall-bladder, cystic and common ducts packed with stones, 129 removed	"	Cured	Infirmary
132	17-12-95	S. W. 37 F.	Cholecystotomy	Gall-stone attacks with jaundice associated with pregnancy (6th month), very weak; gall-bladder contained 8½ oz. of fluid, and 7 large stones	"	Owing to a disturbance in the ward one night, a week after operation, patient aborted, but made a complete recovery. See Case 146	Dr. James, Oulton
134	12-1-96	B. 36 F.	Cholecystotomy	3 large gall-stones impacted in cystic duct. Empyema of gall-bladder. Drainage	"	Cured	Dr. Taylor, Chester
137	5-3-96	G. 40 F.	Cholecystotomy	8 stones removed from gall-bladder. Ducts apparently clear	"	Recovered. Several small stones passed through fistula, which was kept open for several weeks, but ultimately closed spontaneously. Now well	Dr. Burnie, Bradford

No.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
138	17-3-96 P. H. 50 F.	Cholecystotomy	16 gall-stones removed; 3 as large as Brazil nuts	R.	Cured	Infirmary
144	23-6-96 E. R. 37 F.	Cholecystotomy	39 gall-stones removed; drainage	"	Cured	Infirmary
151	27-7-96 S. 34 F.	Cholecystotomy	2 oz. thin pus in gall-bladder; 2 stones size of cherries in cystic duct. Tense adhesion to duodenum separated. Jaundice slight	"	Complete recovery	Dr. Patterson, Dalton-in-Furness
163	24-1-97 B. 35 M.	Cholecystotomy	Spasmodic pain for 15 years. Jaundice on several occasions. Intense pain for several weeks, with slight jaundice. 14 gall-stones removed from cystic and common duct	"		Dr. Raimes, York
165	18-2-97 S. 30 F.	Cholecystotomy	Symptoms, 2 years. On two occasions jaundiced, and gall-stones found in motions. Numerous attacks since last gall-stone found. Slightly distended gall-bladder. No gall-stone found; thickened mucus; chronic catarrh of gall-bladder	"	Doing well	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
167	22-2-97	G. 35 F.	Cholecystotomy	Paroxysmal pains 12 years, usually followed by jaundice, but no gall-stones found in motions. Rigid right rectus. No tumour. 2 gall-stones size of large cherries removed, one from gall-bladder and one from cystic duct	R.	Well, December, 1899	Dr. Grant, Elgin, N.B.
169	25-2-97	E. W. 40 F.	Cholecystotomy	Some jaundice; painful indigestion for 20 years. Severe cholelithic pains since June, 1896. Usually jaundiced after attacks. Empyema of gall-bladder with adhesions; 20 gall-stones removed. Calcium chloride administered before operation	"	Cured	Dr. Beesley, Darton
170	25-2-97	E. B. 33 F.	Cholecystotomy	Painful attacks since July, 1896, following on a fall; tumour in gall-bladder region. Gall-bladder filled with calculi. 26 removed from it and cystic duct, with some mucus	"	Cured	Dr. Atkinson, Ronaldkirk
175	6-5-97	I.A.W. 36 F.	Cholecystotomy	Spasms occasionally for years; two attacks of severe abdominal pain in December and February last, not accompanied by vomiting or followed by jaundice. Great discomfort owing to presence of large tumour in right hypochondrium. Operation: 3 large and 20 small stones removed from gall-bladder; 1 fair-sized, 1 very large and 3 small ones removed from cystic duct	"	Complete recovery	Dr. Lee, Dewsbury

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
179	27-5-97	E. A. N. 59 F.	Cholecystotomy	Gall-stones. First attack 14 years ago; three or four attacks the following year; then an interval of 6 years. For last 6 weeks patient has never been free; sometimes two to four attacks daily. Rigors, vomiting and jaundice have characterized each attack. Tumour present. Operation: Cholecystotomy and removal of numerous gall-stones from gall-bladder, cystic, hepatic and common ducts; cholelithotomy performed on those stones which could not be removed through the gall-bladder incision	R.	Good recovery	Dr. Panton, Bolton
180	12-6-97	M. C. 58 F.	Cholecystotomy	Gall-stone attacks without jaundice for several years. Attacks very frequent of late, and slight jaundice following seizures. Chill and fever after some of the attacks. Operation: Cholecystotomy; 70 gall-stones removed from gall-bladder and cystic duct, and some passed back from the common duct into the gall-bladder and then removed. Drainage	"	Complete and permanent recovery	Dr. Ramsay, York

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
181	17-6-97	L.L.R. 38 F.	Cholecystotomy	First attack of abdominal pain 14 years ago, recurring at intervals of 3 months to 1 year. For 5 days following and including Good Friday patient had one attack daily; then another at Whitsuntide; none since. The attacks are accompanied by rigors and vomiting, and followed by jaundice. Patient passed four small stones per anum after last attack. Operation: Cholecystotomy. Many stones removed, one as large as a pigeon's egg.	R.	Complete recovery	Dr. Empey, Cross Hills
186	21-7-97	M.P. 38 F.	Cholecystotomy	Biliary colic at irregular intervals for 9 years. Jaundice had followed recent attacks, and during month previous to operation there had been attacks of fever with the seizures the temperature reaching 104°. Loss of weight of 16 lb. in the month. Enlarged right lobe of the liver felt, with tenderness over gall-bladder. Operation: Small gall-bladder containing muco-pus and 2 gall-stones, which were removed; drainage. Adhesions extensive	"	Good recovery. well in 1898	Quite Dr. Panton, Bolton

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
189	30-8-97	M. H. 54 F.	Cholecystotomy	Subject to gall-stone attacks, at times followed by jaundice, for 4 years. Loss of flesh. Pain often on left side. Enlarged right lobe of liver, with enlargement of gall-bladder. Spleen felt well below left costal margin, but blood normal. Operation: Numerous gall-stones removed from gall-bladder and cystic duct; drainage of gall-bladder	R.	Good recovery from operation, and returned home within the month. No recurrence of gall-stones. The following year developed phthisis after pneumonia	Dr. Alcock, Goole, and Dr. Churton, Leeds
190	2-9-97	H. S. 40 M.	Cholecystotomy	Acute suppurative cholangitis. First attack of pain 4 years ago; repeated frequently since at varying intervals ranging from 1 to 12 months. Lately they have been very frequent, sometimes three attacks a week. Patient had rigors, dark-coloured urine, light motions, and jaundice. Enlarged gall-bladder easily felt through abdominal parietes. Operation: 1 oz. of pus removed from gall-bladder; also 2 large stones removed from cystic duct, which was ulcerated	"	Complete recovery of health, but at times had a discharge from the scar where the drainage-tube had been	Dr. Sprent, Slingsby

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
191	23-9-97	A. T. 35 F.	Cholecystotomy	Gall-stones. Recurring attacks of paroxysmal pain in right hypochondrium, with vomiting and slight rigors, no jaundice during paroxysms, but, for a few hours after, tumour could be distinctly felt, and then disappeared. Operation: 2 gall-stones removed	R.	Complete recovery	Infirmary
192	23-9-97	I. A. B. 46 M.	Cholecystotomy	Patient has had recurrent attacks of pain, resembling in every way the attacks due to gall-stones, and also followed by jaundice. Operation: No gall-stones found, but thickened mucus in gall-bladder. 'Chronic catarrh.' Drainage of gall-bladder for a fortnight	"	Complete and permanent recovery	Dr. John Clarke, Morley
193	28-9-97	M. G. 50 F.	Cholecystotomy	'Spasms' for years. Swelling on right of abdomen noticed for 4 years. No jaundice. Tumour of gall-bladder could be distinctly felt. Operation: 22 gall-stones removed from gall-bladder and cystic duct, and half a pint of mucus from gall-bladder	"	Good recovery. Quite well some months later	Dr. Woods, Batley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
196	19-10-97	M. B. 51 F.	Cholecystotomy	Gall-stones. First attack 4 years ago, very severe; relieved after several hours by hypodermic injections of morphia. It was accompanied by rigors and vomiting, but no jaundice followed. Frequent attacks since, followed by slight jaundice. No tumour to be felt. Operation: Removal of several gall-stones from gall-bladder and cystic duct, and others crushed in common duct	R.	Good recovery	Dr. Moffatt, Keighley
197	20-10-97	E. W. 42 F.	Cholecystotomy	Gall-stones. Recurring attacks of pain in right hypochondrium, 3 years, accompanied by severe vomiting, retching, and rigors. No jaundice. Tumour present	"	Good recovery	Infirmary
198	8-11-97	M. C. 33 M.	Cholecystotomy	Subject to attacks of gall-stone colic from 1880. Severe attack in 1886, followed by jaundice for a fortnight. Lately attacks every week, but without jaundice. Some tenderness over gall-bladder. Operation: Chronic catarrh of gall-bladder. No gall-stones. Drainage of gall-bladder and detaching of adhesions	"	Complete recovery. There had been no recurrence of pain 6 months later. Well, 1899	Dr. Squance, Sunderland

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
200	25-11-97	M. W. 36 F.	Cholecystotomy	Pain on right of abdomen with tumour simulating movable kidney. Never had spasms. Operation: Cholecystotomy, 10 oz. of pus removed from gall-bladder, and a gall-stone the size of a cherry removed from cystic duct. Drainage	R.	Returned home within a month. Seen in August, 1898, for a pelvic ailment. No further trouble with gall-bladder	Dr. Barrs, Dr. Rumbold, Leeds. Dr. Liddell, Harrogate
202	17-12-97	E. F. 46 F.	Cholecystotomy	Gall-stones. Patient operated on March, 1896, but is said to have derived little benefit therefrom. The operation was only exploratory for symptoms pointing to renal calculus, but nothing was discovered. Was in-patient March, 1897, and transferred to Dr. Churton. Slight improvement under medical treatment. Since May the attacks have grown in severity and in frequency. No jaundice. Operation: Ropy mucus removed from gall-bladder. No stones were found. Drainage	"	Good recovery and marked relief to symptoms	Dr. Smyth, Keighley
203	23-12-97	S. B. 40 F.	Cholecystotomy	Gall-stones. Patient has suffered for 9 years from typical attacks due to presence of stone in gall-bladder and followed by jaundice, and by constipation alternating with diarrhoea. For last 12 months she has been confined to bed. Tumour easily defined. Operation: 56 gall-stones removed from gall-bladder, and about half a pint of muco-pus. Drainage	"	Good recovery	Dr. Atkinson

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
205	7-1-98	J. W. 23 M.	Cholecystotomy	In May, 1890, patient was in the infirmary, when adhesions of the pylorus to the gall-bladder were broken down. He was readmitted in 1892 in consequence of a return of previous pain and taught to wash out his stomach, which afforded him relief. For past 12 months pain has increased in severity, and is localized to old wound. There has been no jaundice. He has lost weight rapidly during last 3 weeks. Operation: Firm adhesions were found between pylorus and under surface of gall-bladder. The adhesions were broken down and omentum interposed	R.	Complete recovery and loss of all pain. June, 1899, patient quite well, and has regained flesh	Dr. Snell, Gargrave
206	20-1-98	M. D. 51 F.	Cholecystotomy	Gall-stones. Recurring attacks of pain since age of 18 years, accompanied by rigors, but no jaundice. Tumour observable by patient since August, 1897. Operation: Gall-bladder aspirated and half an ounce of sweet pus drawn off. 209 stones removed from gall-bladder and ducts	"	Good recovery. Well when last heard of	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
207	27-1-98	A. W. 44 F.	Cholecystotomy	Gall-stones. For 5 years patient has suffered from recurring attacks of paroxysmal pain in region of gall-bladder, lasting several hours, and confining her to bed for some time afterwards. The pain was accompanied and followed by all the usual symptoms on each occasion. No tumour. Operation: A stone, size of a cherry, found in cystic duct, crushed by fingers, and extracted through cholecystotomy opening. Gall-bladder contracted, empty, and surrounded by adhesions. Right lobe of liver abnormal in shape and position. Vertical displacement of liver.	R	Good recovery and well when last seen	Dr. Allott, Barnsley
210	11-3-98	M. H. 50 F.	Cholecystotomy	Attacks of pain over gall-bladder off and on for 17 years; frequent since Christmas, 1897. No jaundice. Operation: 80 gall-stones removed from gall-bladder and cystic duct. Drainage of gall-bladder	"	Good recovery. Quite well when last heard of	Dr. Haydon, Marlboro', Wilts
211	12-3-98	D. H. 45 M.	Cholecystotomy	Hepatic colic and dyspepsia for 10 years. Of late attacks frequent. Loss of flesh. No physical signs. No jaundice. Operation: Cholecystotomy and 350 gall-stones removed from gall-bladder and cystic duct. Adhesions to pylorus and gut separated	"	Good recovery. Quite well in May. Well, December, 1899	Dr. Hyne, Cornwall; Dr. Barrs, Leeds

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
212	19-3-98	M. F. 48 M.	Cholecystotomy	Painful epigastric attacks for several years, followed by vomiting, but without jaundice. Acute symptoms about a week. Increasing swelling under right ribs. Acute cholecystitis with abscess and gall-stones. Operation: Cholecystotomy. Gall-bladder had ruptured, and there was an abscess outside it, limited by adhesions. 12 gall-stones removed. Drainage of gall-bladder	R.	Perfectly well when seen four months later	Dr. Hick, Leeds
214	31-3-98	S. N. 59 F.	Cholecystotomy	Gall-stones. First attack 14 years ago. Pain paroxysmal in character and at first was short in duration, recurring about every two months, but, for a short time previous to admission, came on every 14 days, was much more severe, and lasted for a longer time. Patient vomited and had severe rigors, and each attack was followed by jaundice. No tumour to be felt. Operation: Gall-bladder aspirated previous to opening. 505 gall-stones removed, several crushed in ducts. Firm adhesions round gall-bladder	"	Good recovery	Dr. Erskine Stuart, Batley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
216	7-4-98	E. G. 32 F.	Cholecystotomy	Gall-stones. First attack September, 1897, on leaving her bed after an attack of rheumatic fever. The attacks have recurred frequently since, and have increased in violence. They are always followed by jaundice. No tumour to be made out. Operation: Gall-bladder aspirated and on incision found full of thick bile-stained fluid containing soft, sago-like bodies. No stones found. Drainage	R.	Good recovery. No recurrence of pain	Dr. Davidson, Drighlington
219	7-7-98	M. H. 60 F.	Cholecystotomy	Attacks of gall-stone pains for 15 months, lately very frequent, and followed by slight jaundice. Loss of weight. Operation: Cholecystotomy and detaching adhesions. Sinus between gall-bladder and stomach excised, and stomach wall repaired	"	Good recovery. In September attack of pain, probably catarrhal, as it soon passed off. Regained weight formerly lost. Now well	Dr. Clarke, Doncaster

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
221	7-7-98	J. T. 30 F.	Cholecystotomy	4 years' history of fairly constant pain in the right hypochondrium of a dull aching character, considerably worse on exertion, and on several occasions it radiated into the right sub-scapular region. During the attacks she vomited, but never had a rigor, and was never jaundiced. On abdominal examination a hard globular tender mass was felt below the right costal margin, which was freely movable from side to side, and moved with respiration. Operation: Cholecystotomy. Large oval stone weighing 1 oz. 30 grs., and measuring $2\frac{1}{2}$ by $1\frac{1}{8}$ in., removed from gall-bladder. Gall-bladder drained for 4 days	R.	Complete recovery and well when last seen	Infirmary
224	5-8-98	H. A. 38 F.	Cholecystotomy	20 years' history of attack of pain, starting in right hypochondrium and radiating to right scapular region, generally accompanied by vomiting, but only once by jaundice in one of the first attacks. Pain much more severe lately. Tenderness on pressure over gall-bladder. No tumour felt. Operation: Cholecystotomy. 45 gall-stones removed. Ducts clear. Gall-bladder drained for 6 days	"	Patient did well for 3 weeks, and then left the hospital against advice	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
225	10-8-98	A. S. 50 F.	Cholecystotomy	<p>Patient suffered from spasms when a girl, but was free from trouble up to 4 years ago. Since then she has had frequent attacks of pain, which have become more severe during the last 6 months. Pain commences in the right hypochondrium, and radiates to the right subscapular region. She has been jaundiced after two attacks, and then gall-stones have been found in the motions. Operation: Cholecystotomy. 1 rounded stone, weighing 30 grs., removed from gall-bladder. Ducts free</p>	R.	Very well, September, 1898	Infirmary
227	25-8-98	W.H.S. 50 M.	Cholecystotomy	<p>4 years ago patient had first attack of pain over gall-bladder, since which time he has had frequent seizures. Occasionally he vomits during an attack. On one occasion slightly jaundiced. Operation: Cholecystotomy. Gall-bladder full of thick,ropy mucus. 12 stones removed from cystic duct. Common duct clear. Gall-bladder drained</p>	"	Good recovery. Well when last heard of	Dr. Lambert, Farsley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
228	30-8-98	H.P.G. 29 F.	Cholecystotomy	Attacks of colic for 3 years. At first no jaundice; later, jaundice followed attacks, and several gall-stones were found in the motions. Absence of physical signs except tenderness between the umbilicus and oth costal cartilage. Operation: Cholecystotomy. Gall-stones removed from gall-bladder and cystic duct. Drainage of gall-bladder	R.	Good recovery	Dr. Ross; Dr. Denby, Manningham
231	15-9-98	E. H. 35 F.	Cholecystotomy	10 years ago patient was treated for gastric ulcer; recovered, and enjoyed good health up to 2 years ago. She then had several attacks, within a few weeks, of pain in the epigastrium, radiating to back. Pain severe, and accompanied by vomiting and rigors. No jaundice. Under treatment recovered, and remained free from pain till November, 1897, when she had attacks of pain, accompanied by rigors, and followed by jaundice. Right lobe of liver enlarged. Gall-bladder could not be felt. Operation: Gall-bladder exposed. Adherent to omentum and colon. Distended with thick mucus. No gall-stones found. Gall-bladder drained for a fortnight. Diagnosis: Chronic catarrhal cholecystitis a sequence of gall-stones	"	Good recovery, 1898. No recurrence of attacks	Dr. Rowe, Cowling

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
237	20-10-98	E. R. 47 F.	Cholecystotomy	6 years' history of attacks of biliary colic, accompanied by rigors and vomiting. Attacks more frequent and severe during last 6 months, usually followed by jaundice, which cleared up between the attacks. Tenderness on palpation above and to right of umbilicus. No swelling to be felt. Operation: 13 stones removed from gall-bladder and cystic duct. Drainage	R.	Good recovery	Infirmary
238	22-10-98	M.W.B. 62 F.	Cholecystotomy	Attacks of so-called 'visceral neuroses' 10 years. No jaundice except once, a year ago, which lasted 4 days. Single-faceted gall-stone found in motion after attack. Urine normal. No heart disease. Slight oedema of ankles. Gall-bladder distended and tender. Operation: Distended gall-bladder. No adhesions. Healthy bile aspirated. 59 gall-stones removed, varying from size of small pea to that of a cherry. Drainage of gall-bladder	"	Good recovery. Well, July, 1899	Dr. Irving, Huddersfield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
240	16-11-98	G. W. 62 M.	Cholecystotomy	Attacks of abdominal pain, more in lower abdomen, for 20 years, sometimes followed by jaundice, occasionally followed by vomiting, which relieves pain. No blood. No excess of material, but frothy. Loss of flesh and general feebleness. Tenderness below and to right of umbilicus. Markedly pulsating aorta, with questionable tumour above umbilicus; fulness in gall-bladder region. At first thought to be too ill for operation, but after watching a fortnight, with some improvement, operation thought feasible. Operation: 285 stones removed from gall-bladder and cystic duct. No tumour. Cerebral symptoms and partial paralysis developed 30th day; probably cerebral thrombosis	D.	Recovery from operation, but death 34th day. Cerebral thrombosis. Autopsy. No peritonitis. A small gall-stone found in common duct. Kidneys diseased	Dr. Brown, Denby Dale
241	21-11-98	M. I. 48 F.	Cholecystotomy	Spasms for 15 years, lately more frequent. Loss of 4 stones 5 lb. in 13 years; loss of 1 stone lately. Attacks of pain begin at epigastrium and pass to shoulder. Jaundice once after an attack. 3 gall-stones passed a week ago. Albuminuria, but no tube-casts. Tenderness over gall-bladder. No tumour. Operation: Cholecystotomy. Stone ulcerating its way out at fundus half into peritoneal cavity. No adhesion at that part, but adhesions lower down	R.	Good recovery	Dr. Irving, Huddersfield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
244	14-12-98	D. D. 52 M.	Cholecystotomy	First attack 15 years ago, getting more frequent recently. Latterly stomach troubles. No tumour. Tenderness over gall-bladder. Dilatation of stomach. Operation: Contracted gall-bladder; adhesion of pylorus and intestine to it and to liver. Gall-bladder much thickened. Cystic duct strictured. Drainage. Funnel of omentum used to shut off peritoneal cavity. Visceral adhesions separated	R.	Good recovery	Dr. Holdsworth, Birmingham; Mr. R. N. Hart- ley, Leeds
245	15-12-98	M. N. 57 F.	Cholecystotomy	Well till 8 months ago. Never 'spasms' or jaundice. Six attacks in 8 months. Pain, severe, begins at epigastrium, and passes to right infrascapular region. Examination negative but for tenderness over gall-bladder. Operation: Much adherent dilated stomach. Contracted gall-bladder, containing thick mucus. Separation of adhesions and cholecystotomy. Tube fixed into gall-bladder, and isolated by iodoform gauze	..	Good recovery	Dr. Halliday, Armley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
246	17-12-98	M. P. 59 F.	Cholecystotomy	Stomach troubles for years, but no definite biliary colic till 2 years ago, since which, many. With last, rigor and elevated temperature, but no jaundice. Distended gall-bladder. Operation: Inflamed gall-bladder; about 4 oz. of pus. Single stone the size of starling's egg, in cystic duct, worked back to gall-bladder and extracted; common duct clear	R.	Very good recovery. Well, December, 1899	Dr. T'Anson, Whitehaven
247	23-12-98	J. R. 47 M.	Cholecystotomy	Gall-stone colic $4\frac{1}{2}$ years, at intervals, with intermittent jaundice. No rigors. Jaundiced. Gall-bladder distended and tender. Operation: 180 stones removed from gall-bladder and ducts, varying from size of a pea to that of a marble	"	Good recovery	Dr. Moore, Holbeck

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
248	6-1-99	D.S.B. 66 M.	Cholecystotomy	First attack 11 years ago, intermission for 2 years. Since, more frequent. Three attacks in last month. Distension of gall-bladder for 8 years. Slight jaundice almost continuous for years, but worse after each seizure, never extreme. Has had mitral disease for years; recently slight cedema of feet at nights. Tenderness over gall-bladder. No tumour. No distension of stomach. Urine normal. Loud mitral regurgitant murmur. Slight jaundice. Operation: Cholecystotomy. Single stone in shrunken gall-bladder, which was very friable. Tube stitched into gall-bladder, which could not be brought up. Drainage of right kidney pouch	D.	Little immediate shock, but failure of heart on 2nd day. Death 4th day, with symptoms of pneumonia. No peritonitis	Dr. Barrs, Leeds
249	13-1-99	M.H. 31 F.	Cholecystotomy	Indefinitely ailing 3½ years; 5 attacks of acute gall-stone colic during last year. Never jaundiced. No rigors. Pain usually begins at left side, but always passes to right shoulder. No tumour. Tenderness over gall-bladder. Dilated stomach. Operation: 4 stones removed from cystic duct and gall-bladder. Gall-bladder slightly distended. Pylorus adherent. Adhesions broken down	R.	Persistent vomiting for 4 days, followed by good recovery. At no time was there distension, nor did pulse-rate rise	Dr. Bruce, Grimsby

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
251	22-1-99	M. D. 52 F.	Cholecystotomy	Cholecystotomy January, 1898. Well till September, 1898, when pain and tenderness in gall-bladder region. In October abscess formed and burst externally, since which muco-purulent discharge from sinus. At operation large mass found where gall-bladder attached to parietes, hard and irregular. Part removed for examination. Tube inserted into gall-bladder	R.	Tumour found to be cylindrical epithelioma. Wound healed, and patient returned home within a month	Dr. Ferguson, Thirst
252	2-3-99	S. D. 56 F.	Cholecystotomy	Spasms 3 years, intermittent jaundice. No rigors. Loss of flesh. Distended gall-bladder, tender. Jaundice slight. Operation: Distended gall-bladder. Dumb-bell-shaped stone $1\frac{1}{4}$ in. long in gall-bladder. Another smaller stone blocking cystic duct pressed back into gall-bladder and extracted	"	Good recovery	Dr. Mann and Dr. Woodcock, Leeds

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
260	8-5-99	M. H. F.	Cholecystotomy	Typhoid fever 20 years ago, with cholecystitis. Attacks of 'spasms' on <i>left</i> side of abdomen for years. No jaundice till November, 1898, since which jaundice after each attack. No rigors. Lost 24 stones in weight in 12 months. Pain begins at left of epigastrium, and radiates to back and to both shoulders. Vomiting a marked feature of the case. Never vomited blood. Latterly pain rather more on right side, but still most marked on left. Tenderness under left costal margin and over gall-bladder, but no tumour felt. Operation: 5 stones removed from gall-bladder, one manipulated back from cystic duct. Pylorus adherent to cystic duct just over the stone; adhesions of stomach to liver and to ducts broken down	R.	Good recovery. December, 1899	Dr. Brown, Roundhay
262	9-5-99	R. W. M. 51 M.	Cholecystotomy	Indigestion for years, but pain at lower part of abdomen for 10 months; constipation; loss of flesh; no diarrhoea, but bleeding from rectum for some time, bright red; enlargement over gall-bladder, tender; dilatation of stomach; piles; no stricture of rectum; slight icterus. Operation: Distended gall-bladder, containing pus; single stone, size of hazel-nut, in distal end of cystic duct, removed through gall-bladder; drainage	"	Good recovery	Dr. Ashton and Dr. Rabagliati, Bradford

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
263	12-5-99	M. P. 57 F.	Cholecystotomy	First attack of gall-stone colic 14 months ago, followed by slight jaundice; four attacks in June, 1898; respite till December, when slight seizure; four attacks since July. No rigors; no jaundice; no tumour; tenderness over gall-bladder. Operation: 52 stones, almost all small, removed from gall-bladder; drainage for 1 week	R.	Good recovery	Dr. McCallum, Kendal
265	18-5-99	R. B. 49 M.	Cholecystotomy	Five typical attacks of gall-stone colic during last 6 months; associated with jaundice; no ague-like attacks in intervals; tenderness in usual situation; slight icteric tinge; no tumour. Operation: Adhesions round gall-bladder separated; several small stones removed from gall-bladder, and 1 large stone from cystic duct at junction with common duct	"	Acute ether bronchitis, followed by good recovery	Dr. Mackenzie, Burnley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
267	1-6-99	E. W. 44 F.	Cholecystotomy	Frequent gall-stone attacks a year or more, often followed by jaundice, and sometimes by shivering attacks. Of late attacks as often as two or three times a week. Loss of flesh and strength; swelling below right costal margin, with marked tenderness; slight icteric tinge, but no marked jaundice. Operation: Gall-bladder much contracted. Many adhesions, during separation of which, pus escaped from small abscess cavity in the liver, between it and the diaphragm, to which it was adherent. Several stones removed from gall-bladder. Drainage of gall-bladder; abscess cavity packed with iodoform gauze	R.	Recovery uninterrupted	Dr. Lambert, Farsley
268	5-6-99	E. W. 44 F.	Cholecystotomy	Cholecystotomy 18 months before; mucous fistula persisted; 6 weeks ago severe attacks of pain; another 2 weeks ago; in latter a small gall-stone passed through fistula; both followed by jaundice. Sinus dilated after slight incision; several stones removed by forceps; drainage	"	Good recovery	Dr. Mason, Leeds

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
270	22-6-99	J. G. 46 M.	Cholecystotomy	Frequent attacks of gall-stone colic, followed by jaundice; attacks now about twice a week; slight icteric tinge; slight continuous pain over gall-bladder region, aggravated by pressure; no tumour. Operation: gall-bladder full of gall-stones; 491 removed from gall-bladder and cystic duct down to common duct, which was clear; gall-bladder drained	R.	Good recovery	Infirmary
273	15-7-99	M. J. 37 F.	Cholecystotomy	Cholelithic attacks 10 years off and on; less frequent last 5 years, till January, 1899; occasional jaundice after seizure; loss of flesh; tenderness over gall-bladder; distinct swelling. Operation: Cholecystotomy. Dilated gall-bladder; single stone impacted in cystic duct; few adhesions	"	Good recovery	Dr. Haswell, Penrith

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
275	22-8-98	D. C. 31 M.	Cholecystotomy	<p>Influenza February, 1898; biliary colic, March same year, with jaundice. Slight recurring attacks till January, 1899, when more severe attack with jaundice for 6 weeks, which completely cleared; milder attacks since. For last 5 months stomach symptoms most marked feature, and loss of weight to extent of 2 stones in 16 months. Rigid right rectus; tenderness below 9th costal cartilage; no jaundice; dilatation of stomach. Operation: Cholecystotomy. Much thickened gall-bladder, inspissated mucus; no gall-stones; pylorus intimately adherent to cystic duct; considerable adhesions of stomach to liver</p> <p>Distinct gall-stone attack a year ago, not followed by jaundice, since then seizure each month; twice jaundiced; pain always passes to right shoulder-blade, though considerable stomach trouble; loss of weight, 3 stones; tenderness over gall-bladder; no tumour. Operation: Very extensive adhesions of stomach and colon to gall-bladder, liver, and anterior abdominal wall; pylorus adherent to cystic duct; gall-bladder very much thickened and shrunken, containing inspissated mucus; no gall-stones; drainage for 10 days</p>	R.	Good recovery	Dr. Turner, York
276	24-8-99	M. S. 51 F.	Cholecystotomy		"	Good recovery	Dr. Tait, Mansfield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
278	24-8-99	A. M. 37 F.	Cholecystotomy	History of spasms for 10 years, much more frequent during past 12 months; distended gall-bladder, with constant pain for 6 months; great loss of flesh; no jaundice. Operation: Distended gall-bladder, containing cloudy mucus; two large and one small calculi removed from cystic duct through incision in gall-bladder; drainage	R.	Good recovery	Dr. Murphy, Leeds

(b) CHOLELITHOTRITY, SEPARATION OF ADHESIONS, ETC.

26	15-8-90	E. P. 29 F.	Cholelithotripsy and cholecystotomy	Spasms for years; shrunken gall-bladder, with numerous adhesions. Gall-stone crushed in cystic duct	R.	Recovery	Infirmary
28	30-10-90	S. C. 22 M.	Exploratory. Ad- hesions separated	5 years' history of spasmodic pains in gall-bladder region. Numerous adhesions found and detached	"	Quite well some months after	Infirmary
31	14-11-90	E. W. 40 F.	Cholelithotripsy and cholecystotomy	Large gall-stone crushed in common duct. Jaundice present	"	Rapid recovery and ap- parent cure; well in 1891	Dr. Purdy, Woodlesford
42	2-4-91	E. R. 40 F.	Cholelithotripsy	Gall-bladder not opened; 1 stone size of filbert crushed in cystic duct. Gall-bladder displaced considerably to right	"	No recurrence of symp- toms; well, 1894	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
43	13-4-91	R. F. M.	Exploratory	Epigastric tumour with pains over gall-bladder region. Calcified hydatid tumour with adhesions found	R.	Relieved	Infirmary
46	14-1-92	J. R. 51 F.	Exploratory	Solid tumour of gall-bladder, thought to be malignant. Exploration by needles after abdomen had been opened	"	Ultimate complete recovery without further treatment	Dr. Black, Harrogate
54	6-8-92	F.T.W. 18 M.	Exploratory	Recurrent attacks of pain in hypochondrium. Extensive adhesions of pylorus to gall-bladder broken down	"	Gained 2 stones in weight after operation; well, 1894	Dr. Walker, Kirkby Stephen
63	22-3-93	T. G. 39 M.	Laparotomy and separation of adhesions	Dilatation of stomach following on history of gall-stones. Extensive adhesions of gall-bladder to pylorus separated; gall-stones not found	"	Quite well 3 months afterwards	Infirmary
87	12-3-94	J. G. 39 M.	Laparotomy; separation of adhesions of pylorus to gall-bladder	History of cholelithiasis 6 years before; 5 years' history of pain, vomiting, etc.	"	Gained 2 stones in weight in 3 months; apparent cure	
115	6-6-95	A. L. 25 M.	Laparotomy and separation of adhesions	Spasms; adhesions round pylorus and gall-bladder	"	Cured	Infirmary

N ^o .	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
130	9-12-95	L. M.	Laparotomy, with separation of ad- hesions	Adhesions around pylorus, gall-bladder and liver, causing kinking and dilata- tion of stomach, probably due to gall-stones which had been passed before operation. Separation of ad- hesions	R.	Cured; well 1897, and had gained a stone in weight	Dr. Lownds, Newcastle
131	14-12-95	W. 20 F.	Laparotomy, with separation of ad- hesions. Pyloro- plasty	Adhesions around pylorus, gall-bladder and liver, causing kinking and dilata- tion of stomach, with stricture of pylorus, probably due to gall-stones which had been passed before opera- tion. Pyloroplasty and separation of adhesions	"	Cured	Well, 1899 Dr. Salter, Scarborough
139	23-6-96	E. F. 44 F.	Exploratory	Pains over gall-bladder; no stones; adhesions separated	"	Cured. In May the patient said she was better than for many months	Infirmary
154	27-8-96	S. H. 38 F.	Cholelithotomy	'Spasms' 12 years; gall-bladder shrunken, and adherent to surround- ing structures; too small to bring to surface. Stones found and crushed	"	Cured	Infirmary
160	24-12-96	C. 42 F.	Exploratory and separation of ad- hesions	Spasmodic pain resembling gall-stones. Abdominal section and separation of adhesions of gall-bladder to stomach and colon	"	Recovery. No pain since Dr H. J. Robson, operation reported in Leeds February, 1899	

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After History.	With whom seen.
166	18-2-97	D. C. 36 M.	Laparotomy and separation of adhesions	Paroxysmal pain over upper right abdomen 20 years, rigid right rectus; no tumour; membranous casts found in motions for some time before operation. Exploration; adhesions of gall-bladder to duodenum, omentum and colon separated; no gall-stones found	R.	Perfect recovery. 1899	Mr. Jonathan Hutchinson and Dr. Porter, Helmsley
184	15-7-97	S. H. 52 F.	Exploratory	Gall-stones. Patient had suffered from 'spasms' since the age of 17. The 'spasms' had lately increased in number and severity, and were accompanied by vomiting and followed by jaundice. Operation: Liver found nodular and much contracted (cirrhosis). Gall-bladder contracted over several stones, but ducts free. Wound closed without further interference, as the bleeding was very free and the patient was bearing the operation badly	"	Decided relief. Wound healed by first intention, and patient returned home in third week	Dr. Ellis, Halifax
199	18-11-97	L. S. 35 F.	Laparotomy	Typhoidal cholecystitis in March and April, 1897; intestinal obstruction, November, 1897. Operation: Division of band stretching from liver to colon and omentum, and compressing hepatic flexure of colon	"	Complete recovery	Dr. Crawford, Ingrow

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
258	4-5-99	C. T. 30 M.	Separation of vis- ceral adhesions to gall-bladder and bile-ducts	<p>Attacks of gall-stone colic for 12 years; typhoid in September, 1898; very severe attack of infective cholangitis in January, 1899. This cleared off, and patient in fair condition in April. Tenderness over gall-bladder region; no tumour; no dilatation of stomach; pulse soft, but slow. Operation: At operation many adhesions of stomach to gall-bladder and liver; small gall-bladder very high up under ribs; several stones in cystic duct and common duct also. Under anæsthetic patient's pulse ran up to 150, and only separation of adhesions was done, as the gall-stones seemed fixed; and it was thought they might not give further trouble, the later attacks being probably due to visceral adhesions</p>	R.	Good recovery. Well December, 1899. Re- gained lost weight	Dr. Harvey, Lon- don, and Dr. Turner, York
261	8-5-99	H.A.F. 42 F.	Separation of ad- hesions around common duct	<p>Gall-stone colic every 3 weeks for 2 years; jaundiced for 3 months; ague-like attacks recently; no tumour; tenderness over gall-bladder; well-marked jaundice. Operation: Very dense adhesions of stomach and pylorus to gall-bladder and liver. Gall-bladder shrunken; common duct strictured by adhesions; no gall-stones; adhesions broken down</p>	"	Good recovery. Jaundice disappeared before the patient returned home within the month; no recurrence of rigors	Dr. Woodyatt, Halifax

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
268	25-5-99	E. M. 52 F.	Laparotomy	History of gall-stone colic; attacks at intervals for 17 years; four in last month, usually followed by jaundice; acute-like attacks recently, with loss of flesh and strength; tenderness in usual situation; slight icterus. At the operation the liver was found displaced vertically, the left lobe being high up under the diaphragm, and the usual surface facing to the left. Adhesions were so extensive, and the patient was taking the anæsthetic so badly — the pulse having gone up to 150 — that I felt it wiser not to follow up the operation after examining in the presumed position of the gall-bladder and ducts and not feeling any calculi	R.	Complete recovery fol- lowed; and after the operation the jaundice cleared, and there were no further attacks of pain or fever	Dr. Tyrie, Keighley

OPERATIONS FOR INFECTIVE CHOLANGITIS OR DEEP JAUNDICE.

6	14-6-88	G. T. 40 F.	Cholecystotomy	2 large gall-stones removed; empyema of gall-bladder and abscess of liver; jaundice	R.	Mucous fistula; otherwise well. See Case 58	Dr. Churton
27	2-9-92	J. E. 25 F.	Cholecystotomy	Gall-stones in gall-bladder, with empyema; also abscess of liver, containing gall-stones (38 in all)	"	Apparent cure. Well when heard of some months later	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
38	5-3-91	J. L. 45 M.	Cholecystotomy and cholelithotrixy	Deep jaundice; gall-stone crushed in common duct	R.	Recovery from operation, but a month later diarrhoea and sudden death, apparently from perforation of bowel; nothing abnormal in region of bile-ducts; wound had healed	Dr. Drake
40	19-3-91	H.M.C. 42 F.	Cholecystotomy	Intense jaundice; gall-stone, $\frac{3}{4}$ in. diameter, removed	"	Relief. After returning home at end of month contracted influenza, and had fatal pneumonia	Infirmiry
56	29-9-92	T. 50 F.	Cholecystotomy and cholelithotrixy	Jaundice 9 months; shrunken gall-bladder; cholangitis; gall-stone in contracted bladder, and several in cystic and common ducts crushed. Case had been pronounced malignant by a consulting physician, and operation not advised	"	Well, 1893	Dr. Harwood, Burnley
57	4-10-92	E. 50 F.	Cholecystotomy	Jaundice 10 months; ague-like attacks due to cholangitis; 2 large gall-stones in gall-bladder, 1 in common duct removed by scoop. Cancer diagnosed by consulting physician, and operation not advised	"	Well, 1893	Dr. Clifton, Sheffield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
92	9-6-04	M. 46 F.	Cholecystotomy	Excessive vomiting for 6 weeks, and during past 3 weeks had subsisted on nutrient enemias; very ill; gall-bladder contracted, and surrounded by firm adhesions; jaundice present, and infective cholangitis; 18 gall-stones removed from ducts, and gall-bladder drained without complete suture to parietes	D.	Death from exhaustion, due to continuation of vomiting on 12th day after operation; no peritonitis	Dr. Townsend, Cork
136	17-2-96	S. 51 F.	Cholecystotomy	Slight jaundice; infective cholangitis; 40 gall-stones removed from gall-bladder and cystic duct, and 2 crushed in common duct; wound healed 27th day	R.	Cured. 1897	Well, January, Dr. Barrs
153	20-8-96	E. E. 38 F.	Cholecystotomy	Jaundice; infective cholangitis; 2 gall-stones removed; symptoms for 5 years; acute 2 months; contracted gall-bladder with numerous adhesions	D.	Oozing from torn adhesions led to death from hæmorrhage, which was concealed at first. No vessel of any size could be found, but every point bled. Calcium chloride inadvertently omitted subsequent to operation	Dr. Mackenzie, Bradford
155	15-10-96	R. T. 56 F.	Cholecystotomy	'Spasms' almost continuous for 6 months; jaundice and rigors; cholangitis; no gall-stones present. Numerous adhesions around ducts separated	R.	Cured	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
159	17-12-96	T. 65 M.	Exploratory and drainage, with separation of adhesions	Violent pain; slightly distended gall-bladder; greatly dilated stomach; pyloric stenosis; extensive adhesions; no gall-stones found; rigors and fever accompanied attacks of pain. The gall-bladder contained dark, thick, grumous material, and similar contents were found in the stomach, to which it was adherent	D.	Shock, 36 hours. Unfortunately the autopsy could not be made until 48 hours after death, when decomposition and post-mortem digestion had softened the tissues and prevented the exact nature of disease being made out. The question of previous gall-bladder stomach fistula could not be determined	Dr. Selkirk, Boston Spa
162	15-1-97	H. 59 F.	Cholecystotomy	Spasmodic pain for years; jaundice in November; cholangitis with rigors, etc. Removal of to large gall-stones from gall-bladder; drainage	R.	The patient returned home in 3 weeks, and looked quite to years younger than before operation	Dr. West, Morley
174	10-4-97	A. G. 33 F.	Cholecystotomy	Attacks of paroxysmal pain, varying in intensity, in right hypochondrium, since age of 18. Since October last the attacks have been followed by jaundice, and occasionally by rigors and fever. Pain of late more on left side than right; she has lost weight; no tumour, but great tenderness felt over region of gall-bladder. Operation: 6 gall-stones and some inspissated bile removed; adhesions to pylorus separated	"	Complete recovery	Dr. Hector, Drighlington

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
176	19-5-97	M. H. 47 M.	Cholecystotomy	'Spasms' for years; for 6 weeks severe pain, with swelling below right costal margin; jaundice first noticed a month ago; has had several ague-like seizures, and during week before operation was acutely ill with manifest local peritonitis. Operation: Gall-bladder dark in colour and full of grumous pus; one or two greenish patches, as if gangrenous; 9 gall-stones removed; adhesions of omentum not disturbed; free drainage	R.	Complete recovery	Dr. Smith, Hyde Park
213	29-3-98	M. D. 45 M.	Cholecystotomy	Painful epigastric attacks 12 months, with vomiting, but no jaundice; deep jaundice since January 1, with ague-like attacks; loss of 2½ stones in weight. Operation: Drainage of distended gall-bladder; thickened duct felt thought to be cancer of head of pancreas and common bile-duct; drainage of gall-bladder for 10 days	"	Complete recovery, and disappearance of jaundice. Quite well, August 16, 1898; had gained 1 stone in weight	Dr. Robertson, Pickering

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
222	12-7-98	M. P. 53 M.	Cholecystotomy	No pain before 4 months ago; several attacks since; 2 months ago pain, followed by jaundice; recurring pains, followed by deepened jaundice and ague-like attacks; great loss of flesh. Operation: 2 large gall-stones, the size of walnuts, removed from common duct through the cystic duct and gall-bladder; 12 other smaller concretions removed from gall-bladder and cystic duct. Pus in gall-bladder	R.	Within 5 weeks gained 10 lb. in weight; recovery very satisfactory. Well, June, 1899; has gained 2 stones in weight, and looks in robust health	Dr. Robinson, Poole, Dorset
229	4-9-98	W. S. 56 M.	Cholecystotomy	Sister and brother suffered from gall-stones. Four years ago characteristic gall-stone attacks, followed by slight jaundice; occasional 'spasms' before and since; a year ago began with ague-like attacks and slight jaundice, lasting for 6 months; loss of flesh about 1½ stones; tenderness 1 in. above and to right of umbilicus; no enlargement of liver. Operation: Very firm adhesions of stomach, omentum and intestine to liver and gall-bladder; gall-bladder shrunken and filled with muco-pus. Cholecystotomy and drainage; no gall-stones felt in ducts	"	Good recovery. Quite well for some weeks, but recurrence of pain, and cholecystectomy performed with good result	Dr. Cattell, Nottingham

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
235	3-10-98	A. S. 50 F.	Cholecystotomy	<p>2 years' history of attacks of abdominal pain, commencing about the umbilicus, radiating to the back. Attacks were of moderate severity, and occurred at frequent intervals; no vomiting or rigors. 3 weeks ago, after a severe attack of pain, patient became jaundiced, with clay-coloured motions and high-coloured urine. Jaundice has persisted up to the present, and she has had several attacks of pain; one in the infirmary was very severe. Tender spot above and to right of umbilicus; no distended gall-bladder to be felt.</p> <p>Operation: No gall-stones felt in gall-bladder or bile-ducts, but, as jaundice was thought to be obstructive, cholecystotomy was performed. Beyond severe vomiting, there appeared to be no cause for anxiety; but on October 10 the patient died suddenly, apparently from syncope</p>	D.	<p>At the post-mortem examination the kidneys were found to be granular, and capsules very adherent; but beyond this nothing was found to account for death. So far as the operation was concerned everything was satisfactory. The wound was healed, and there were no signs of peritonitis</p>	Infirmary

CASES OF HEPATOTOMY.*

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
152	31-7-96	G. M.	Hepatotomy and cholecystotomy	Persistent jaundice for several months and loss of 21 lb. in weight, due to chronic catarrh of bile-ducts; large fluctuating tumour; liver dulness below umbilicus. Hydatid cyst removed; drainage	R.	Recovery; jaundice disappeared slowly within 2 months. Quite well, January, 1897	Dr. Sadler. Barnsley
157	18-12-96	M. 44 M.	Hepatotomy and cholecystotomy	Jaundice and pain; attacks like gall-stone seizures; chronic catarrh of bile-ducts due to hydatid disease. Hydatid cyst removed from liver; drainage	"	Healed; jaundice gradually disappeared	Infirmary
161	28-1-97	H. M. 44 M.	Hepatotomy and cholecystotomy	Hydatid disease, 6 years; simulating gall-stone attacks, 1 year; small cysts probably discharging into bile-ducts; infective cholangitis and jaundice. Hepatotomy, the incision being at the lower and back part of the right lobe. Jaundice	"	Good recovery	Dr. Scatterly. Keighley

* Only cases where symptoms of gall-bladder trouble were present are given here.

CASES OF MALIGNANT DISEASE.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
11	10-9-88	G. B. 50 M.	Cholecystotomy	Intense jaundice; distended gall-bladder; cancer of pancreas	D.	9th day, hæmorrhage and exhaustion	Dr. Clifford Allbutt
12	23-12-88	W. T. 42 M.	Cholecystotomy	Deep jaundice and infective cholangitis; distended gall-bladder; cancer of common bile-duct	R.	Relief for a time; death later from progress of disease	Dr. Churton
25	22-6-90	B. 42 F.	Exploratory	Jaundice; tumour close to common duct, thought to be malignant	"	Perfectly well some months after	Dr. Sykes, Cleckheaton
33	29-12-90	J. R. 45 F.	Cholecystotomy	Cancer of pancreas, with gall-stones; intense jaundice; hæmorrhage from nose, bowel, etc.	D.	Patient extremely exhausted at time of operation, which probably did not much hasten death	Dr. Hollings, Calverley
36	17-2-91	T. G. 50 M.	Exploratory	Distended gall-bladder; 30 oz. fluid removed by aspirator; tumour of head of pancreas; deep jaundice	R.	Marked relief; returned home within the month	Dr. Chatham
51	1-4-92	W. P. 32 M.	Cholecystotomy	Deep jaundice; distended gall-bladder; emaciation; no pain; no gall-stones; hardness of head of pancreas; scirrhus (?)	D.	Patient much exhausted and emaciated at time of operation; almost died under anæsthetic; died apparently from shock on second day	Dr. Woods, Kilinghall, and Dr. Harrs

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
52	7-6-92	A. D. 35 M.	Exploratory	Malignant disease of liver; jaundice and symptoms of gall-stones	R.	Recovered	Infirmary
66	5-5-93	M. T. 54 F.	Exploratory	Cancer of gall-bladder; large hard nodular tumour yielding only blood to exploring syringe; every appearance of malignancy	"	Wound healed by first intention, and patient left apparently relieved, and reported to be well some months later	Infirmary
82	18-1-94	S. E. 27 M.	Exploratory	Malignant tumour of gall-bladder and liver	"	Recovery	Infirmary
91	30-5-94	J. P. 49 M.	Laparotomy	Chronic catarrh of bile-ducts, and jaundice; tumour of liver, probably soft carcinoma with suppuration. Drainage	"	Improved, sinus remaining	Infirmary
98	12-9-94	H. 60 F.	Laparotomy	Cancerous nodules on liver, and jaundice. Gall-bladder dilated	"	Recovered from operation, but ultimately died some weeks after from progress of disease	Dr. Broughton, Dewsbury
103	10-12-94	A. 50 M.	Laparotomy	Persistent jaundice; malignant disease. Drainage of gall-bladder, with decided relief for a time	"	Recovered from operation; returned home at month end; died some months later	Dr. Menzies, Edinburgh

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
119	18-7-95	W. L. 62 M.	Cholecystotomy	Spasms and jaundice 20 years; cancer of liver and gall-bladder. 32 gall-stones removed; drainage	R.	Recovered from operation; relief from pain and from jaundice	Infirmry
122	27-7-95	G. 40 M.	Laparotomy	Persistent jaundice; cancer of liver and pancreas	"	Recovered from operation; relief for some weeks	Dr. Bronner, Bradford
126	18-11-95	B. H. 60 M.	Laparotomy	Jaundice and pain; cancer of pancreas	"	Decided relief for several months	Dr. Haynes, Low Moor
133	4-1-96	S. 50 F.	Laparotomy	Gall-stones; extensive malignant disease of cystic and common ducts; persistent jaundice	"	Recovered from operation, and was relieved for a time, but died 6 or 8 months afterwards	Dr. Booth, Grimsby
135	-2-96	M. D. 52 M.	Laparotomy	No stone found. Drainage disease	"	Relieved	Infirmry
140	26-3-96	J. P. 53 M.	Laparotomy	Malignant disease in gall-bladder, secondary to pyloric cancer; jaundice	"	Recovered from operation, but unrelieved	Infirmry
142	1-6-96	R. 62 M.	Exploratory	Tumour in gall-bladder region; malignant of liver and gall-bladder; jaundice	"	Recovered	Dr. Gibson, Kirkby Stephen

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
143	8-6-96	H. 32 F.	Exploratory	Persistent and deep jaundice 17 months; frequent and various hæmorrhages for several months; tight stricture of common duct; no gall-stones; questionable malignant disease	D.	Death occurred from hæmorrhage and shock 24 hours after operation	Dr. Sharpe, Matlock
147	13-7-96	D. T 37 M.	Cholecystenterostomy	Biliary fistula following operation at St. Bartholomew's Hospital; persistent jaundice; no stones found; tumour probable. Cholecystenterostomy by Murphy's button	R.	Bile all passing into bowel, and wound healed	Dr. Sykes, Barnsley
148	13-7-96	S. F.	Exploratory	Persistent jaundice; gall-stones in shrunken gall-bladder and in common duct; extensive cancer of liver; operation not proceeded with; hæmorrhage in wound afterwards, but controlled by calcium chloride	"	Recovered from operation and lived 4 months longer	Dr. Empey, Skeeton
149	17-7-96	A. S. 49 M.	Cholecystenterostomy	Cancer of pancreas and common duct; distended gall-bladder; jaundice continuous for 4 months; no gall-stones	D.	Intraparietal and intraperitoneal hæmorrhage; no peritonitis; very exhausted at time of operation, but lived a week after	Infirmary
164	22-1-97	B. 50 F.	Exploratory	Cancer of liver and gall-bladder; jaundice	R	Recovered from operation, but not materially relieved	Dr. Williams, Harrogate

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
172	18-3-97	E. S. 60 F.	Cholecystotomy	Patient admitted with continuous pain in right hypochondrium, associated with distended gall-bladder and some œdema of legs; jaundice deep and continuous. Operation: Cancer of common duct and head of pancreas. Cholecystotomy performed to relieve jaundice	R.	Relieved for a time, and patient returned home	Dr. Nicholson, Gainsborough
178	25-5-97	M. S. 65 M.	Cholecystenterostomy	Indefinite history of past pains; influenza, followed by deep jaundice. 12 weeks before; pain did not precede jaundice; rapid loss of flesh and repeated rigors, with temperature 104° and 105°; uniform enlargement of liver; petechiæ in skin, and epistaxis. Diagnosis: Suppurative cholangitis. Operation: Cholecyst-enterostomy by Murphy's button. Thickening of common duct (? nature) felt, together with gall-stones in common duct	D.	Death from exhaustion and shock 3rd day	Dr. Thompson, Skipton
183	28-6-97	M. G. 53 F.	Cholecystotomy	Spasms for 18 years; for a year severe pain, failure of health, and loss of weight; jaundice and ague-like attacks for a month; no tumour. Operation: A number of gall-stones removed, but cancer of junction of cystic and common ducts, with a cancerous nodule in liver, found; drainage of gall-bladder	R.	Decided relief for a time, and patient returned home within the month	Dr. Clarke, Morley; Dr. Hector

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
185	16-7-97	M.A.M. 50 F	Cholecystotomy	Attacks of abdominal pain since 15. August; confined in bed 12 weeks; patient had rigors, vomiting, and jaundice. Second attack in February, in bed 5 weeks; urine high-coloured, motions pale; on examination great tenderness over gall-bladder, but no tumour could be felt. Operation: Gall-bladder found full of stones, 76 removed; very extensive adhesions in all directions were found; there was a malignant growth, involving pylorus	R.	Good recovery from operation, and marked relief to symptoms	Infirmary
230	6-9-98	W. R. 60 M.	Exploratory coeliotomy	3 years ago had pain at epigastrium; February, 1897, severe pain over liver, without jaundice; 11 months ago another attack, followed by jaundice, which has persisted; great loss of flesh; has bled from the bowel. Operation: Large mass infiltrating liver and involving head of pancreas; enlarged gland in gastro-hepatic omentum	"	Recovered from operation, and returned home apparently relieved	Dr. Dearden, Bradford

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
232	21-9-98	M. B. 48 F.	Cholecystotomy	'Spasms' 20 years ago, without jaundice; no recurrence till 6 weeks ago, when jaundice supervened and has continued, with rapid loss of flesh and strength, and with nausea and vomiting; tenderness over gall-bladder, but no tumour to be felt; patient very stout. Operation: Cholecystotomy performed, and 4 gall-stones removed from gall-bladder and cystic duct; tumour felt at junction of cystic and common duct, hard and nodular; no other gall-stones felt. Drainage of gall-bladder by tube, which was shut off from the peritoneal cavity by suturing omentum around opening in gall-bladder	R.	Recovered from operation, and relieved. Wound healed entirely by first intention except at site of tube. No bile appeared till 9th day; it then flowed freely till 14th day, when it ceased. Probably owing to the growth advancing to hepatic duct	Dr. Goldsmith, Bedford
233	22-9-98	J. F. 39 M.	Exploratory coeliotomy	Five well-marked attacks of gall-stones and numerous slighter ones in 5 years; gall-stones found in motions; absence of enlargement of gall-bladder and liver. Operation: Gall-stones in gall-bladder, but gall-bladder and liver infiltrated with what appeared to be cancer, which had, however, not formed sufficiently large nodules to be felt through the abdominal wall	"	Great relief from operation; jaundice had almost disappeared when he left Leeds at the month end. May 24, 1899: Patient very well; has had no pain since operation, and has gained weight	Dr. McCullum, Kendal

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
239	27-10-98	W. D. 42 M.	Exploratory laparotomy	10 years ago attack of pain in right hypochondrium; no jaundice; free from attacks up to six weeks ago; he had then a severe attack of pain in right hypochondrium, radiating to back and shoulders, accompanied by rigor and vomiting, and followed by jaundice; jaundice has persisted up to the present; no swelling to be felt. Operation: Mass of growth in head of pancreas. Wound closed	R.	Recovery with great relief to jaundice, which is rapidly passing off. I suspect the enlargement of the head of the pancreas is a form of chronic pancreatitis, as it was too soft for scirrhous. I very freely manipulated it to feel if there was a gall-stone in the termination of the common bile-duct, and this may have dislodged something from the pancreatic duct	Dr. Chaffers, Keighley
242	1-12-98	G. J. 61 M.	Cholecystenterostomy	Jaundice for 8 weeks with little pain; no history of gall-stones; feeling of discomfort over gall-bladder, which was distended; loss of weight very considerable. Operation: Cancer of head of pancreas. Cholecystenterostomy with aid of Murphy's button	"	Good recovery. Button passed 16th day	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
250	24-2-99	M. K. 34 F.	Exploratory	No history of 'spasms'; influenza December 3, 1898; became jaundiced December 20, 1898; no pain; jaundice continued; January 16, 1899, became feverish, temperature 104°; fever continued, hectic type; at first liver enlarged and very tender, cough throughout always provoked by pressure on gall-bladder; no physical signs in chest; never pain; pulse slow throughout; ascites, with deep jaundice and fever. Exploratory operation in gall-bladder region; Blood effusion in sheath of rectus, and large amount of ascitic fluid let out; no gall-stones or tumour felt, but doubtful swelling at head of pancreas, and cirrhosis of liver; disease probably cancer of papilla, with subsequent infective cholangitis	D.	Shock and exhaustion led to death on third day. No autopsy	Dr. Coombs, Bedford
251	25-2-99	M. B. 55 M.	Exploratory cœliotomy	Attacks of biliary colic for 25 years, till January, 1893; then interval till July, 1898, when dyspeptic troubles, jaundice in August, without any colic, persisting since; no pain or rigor since; great loss of flesh; liver enlarged, 3 in. below ribs, nodular in epigastrium; deep jaundice. Operation: Cancer of gall-bladder and cystic duct, with secondary deposit in liver; many gall-stones in gall-bladder	R.	Patient seemed to pick up strength after operation, and returned to London, where he died, apparently from syncope, 7 weeks after operation	Dr. Batchelor, Dunedin, New Zealand

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History	With whom seen.
47	1-2-92	P. 56 F.	Cholecystotomy	Chronic jaundice, with attacks of pain over liver; hæmorrhagic diathesis. Cancer of liver found; chloride of calcium used before operation; little bleeding	R.	Greatly relieved for over a year	Dr. MacGregor Young, Leeds
274	20-7-99	J. B. 62 F.	Cholecystotomy	Spasms since adolescence; in later years occurred once a month; before this attack no jaundice; present illness began April, with a seizure like gall-stone colic; jaundice at end of week, which has persisted since; tenderness and pain under right costal margin; no rigors; abdomen distended; no visible peristalsis; tumour hard, somewhat irregular, and fixed in gall-bladder region; patient very much jaundiced; very weak; cardiac disease. Operation under cocaine: Gall-bladder simply opened and stitched; no attempt to remove stones which were felt	D.	Oozing from wound for 2 days; patient gradually sank. Post-mortem examination: 2 large stones in gall-bladder. At junction of cystic, hepatic, and common duct, tumour about size of a filbert; no adhesions; duct completely occluded; no peritonitis	Infirmary

Calculi in the Common Bile-duct.

Before proceeding to a description of cholelithotripsy or choledochotomy, it may be advisable to refer to the special condition of cholelithiasis, where the gall-stones are in the common duct, which, according to Courvoisier, occurs in about 4 per cent. of all cases. A reference to the cases that have come under our care shows this to be an under-estimate, as, out of 249 cases of cholelithiasis operated on, there were gall-stones in the common bile-duct on thirty-three occasions, which equals 13.25 per cent.

Fenger has recently written on this subject in the *Annals of Surgery*, and quotes Conrade's statistics; he says that, in ninety-seven cases, he found gall-stones in the gall-bladder alone in eighty-two, in the gall-bladder and common duct in ten, and in the common duct alone in five.

Courvoisier says that in two-thirds of the cases there is only one gall-stone, and in the remaining third they are multiple, six being the largest number found. Our experience shows a much larger proportion of multiple calculi in the common duct.

In 67 per cent. the stone is in the duodenal end of the duct, in 15 per cent. in the hepatic, and in 18 per cent. in the middle portion, where it is most easily reached. In about a quarter of the cases the duct was dilated, and in some it was cystic, and the gall-stone floating.

Fenger has dwelt on the great importance of the ball-valve action of floating stones in the common bile-duct as explaining the remission of jaundice in many cases, where it might have been supposed that the jaundice would be persistent. In the greater number of the cases of floating stone tabulated below, the concretions were, though easily moved by the fingers, too fixed to be called floating.

Fenger explains the contracted condition of the gall-bladder, which is almost universally found in cholelithiasis, by this floating of gall-stones in the ducts; but, as the same condition occurs where the gall-stones are fixed, this explanation must be only a partial one.

In a paper before the Clinical Society in 1888, and again

GALL-STONES, OR CHOLELITHIASIS

in 'On Gall-stones and their Treatment,'* published in 1861, attention was drawn to this contraction of the gall-bladder as an important diagnostic point, and this has been borne out by other observers independently. It was then pointed out that jaundice with distended gall-bladder was presumptive evidence in favour of malignant disease, but that jaundice



FIG. 46.—HEPATIC AND COMMON DUCTS DISTENDED WITH CALCULI—ONE IN CYSTIC DUCT, NONE IN GALL-BLADDER.

(No. 2,825, Royal College of Surgeons Museum.)

without distended gall-bladder favoured the diagnosis of cholelithiasis.

Of thirty-five operations for obstruction in the common duct, Courvoisier found that eighteen were due to causes unconnected with gall-stones, such as cancer, stricture, or tumour; out of these, the gall-bladder was dilated in sixteen.

* 'On Gall-stones and their Treatment,' Mayo Robson. Cassell and Co.

whereas only seventeen were dependent on gall-stones, and out of these seventeen, the gall-bladder was atrophied in thirteen.

Whilst Fenger's explanation is not all-sufficient to account for this contraction of the gall-bladder, neither does that given by Courvoisier fully explain it; he says the contraction is due to chronic inflammation of the walls of the gall-bladder set up by the stones when in it, before they passed into the ducts. This cannot account for all cases, for in some the gall-stones have never been in the gall-bladder, having been formed in the hepatic, or common ducts. The condition is probably due to a combination of causes:

1. All cases of cholelithiasis producing symptoms are accompanied by inflammation of the walls of the biliary passages, as shown by the almost universal presence of adhesions around the gall-bladder.

2. Gall-stones in the common duct seldom cause complete obstruction, either because they are floating in the duct or because they only partially fill it; there is therefore no sufficient backward pressure to cause dilatation of the gall-bladder.

3. The muscular coat of the gall-bladder, though feeble, is sufficient to enable it to contract, which it doubtless does in efforts of expulsion when there is any obstruction in the common duct.

4. The contraction, from being at first intermittent, becomes in the long-run constant, and the accompanying inflammation fixing the contracted gall-bladder, it atrophies.

The special symptoms pointing to stone in the common duct are: Absence of enlargement of the gall-bladder, with frequent attacks of pain, which is usually less severe when the gall-stones are in the common duct than when they are in the cystic duct, followed by an intensification of the jaundice, which in many cases never quite disappears. The seizures are often associated with intermittent feverish attacks and loss of weight. The pain is in the epigastric rather than in the right hypochondriac region, and passes through to the right dorsal or lumbar, rather than to the right infrascapular region, and the tender point is found between the umbilicus

and ensiform cartilage rather than between the ninth costal cartilage and umbilicus, as in ordinary cholelithiasis.

Where jaundice is continuous and intense without much variation, especially if the gall-bladder be enlarged, there is usually malignant disease or some other cause than gall-stones. All the other symptoms characteristic of gall-stones may have been present for some time previously, or may coexist with those above mentioned.

The treatment of calculous obstruction in the common duct is of the utmost interest, both on account of the difficulties to be overcome and the great importance to the patient, who in the greater number of cases is otherwise condemned to a lingering and painful illness, often ending in death.

1. In a few cases, concretions may be manipulated backwards into the cystic duct, and thence extracted by scoop or forceps, but this is seldom practicable on account of the contraction of the gall-bladder and cystic duct.

2. Occasionally a small stone may be pressed into the duodenum, but this is exceptional and not generally to be recommended, as not infrequently it may be pushed into a dilated diverticulum of Vater, and so be missed, and the whole operation rendered futile.

3. Cholecystotomy, with subsequent treatment of the obstruction by solvent injections of olive-oil or soap solution, is well worth bearing in mind on account of its simplicity and safety, together with the certainty of giving immediate relief with a modicum of risk, and putting the patient in better condition for subsequent treatment should such be necessary. It is of special value in patients too ill to bear a prolonged operation.

4. Cholelithotrixy, or crushing the stones *in situ*, where the concretions are sufficiently soft to yield to the pressure of the finger and thumb, is a method of treatment which is especially applicable to cases where the common duct is difficult to reach, as in very stout subjects, or where it is desirable to avoid prolonging the operation. It is only available in the case of soft concretions, and may have to be supplemented by injecting the ducts with a solvent solution.

5. Needling concretions through the duct walls, recommended by certain operators, is not unattended by danger, as the damage to the walls of the ducts may lead to subsequent trouble. It is not necessary for soft stones, and uncertain in the case of hard concretions.

6. Cholecystenterostomy, or short-circuiting the obstruction, may be adopted where the patient is too ill to bear a prolonged operation, but it is by no means an ideal operation, as it leaves the obstruction untouched. Moreover, since in gall-stone obstruction the gall-bladder is usually contracted, in the greater number of cases, cholecystenterostomy is not available.

7. Choledochenterostomy, or uniting the dilated cystic or common duct to ~~the duodenum~~, in case of largely dilated ducts with contraction of the gall-bladder, may be called for on rare occasions.

8. Choledochostomy, or attaching the dilated duct to the surface and draining it, is so frequently associated with infection of the ducts in the liver, that in nearly all the cases reported a fatal result has followed. The operation is rarely called for.

9. Choledochotomy, or incising the duct and removing the calculi, is the operation *par excellence* for the treatment of gall-stones impacted in the ducts and which cannot be removed by any simple means.

10. Duodeno-choledochotomy, or reaching the duct through the opened duodenum for stones impacted in the duodenal end of the duct, is a useful modification of the operation.

It will thus be seen that the surgeon has a great variety of operations to choose from, and he will act the wisest, who, knowing all, is able on the spur of the moment to choose that peculiarly adapted to the case in hand.

Cholelithotripsy was first suggested and put in practice by Lawson Tait, and has since been extensively and most successfully employed by many surgeons. The ordinary incision for cholecystotomy may be large enough, but if the patient be stout, or the ducts cannot easily be reached, it may have to be increased so as to allow the hand to pass into

the peritoneal cavity, in order that the fingers may locate and grasp the stone *in situ*. If the right hand be used, the thumb will enter the foramen of Winslow, and the index-finger will pass in front of the common duct; or in case of the left hand being used, these digits will be reversed, when the whole force of the opposing finger and thumb can be brought to bear on the concretion.

Usually the gall-stone flattens out into a wafer shape, and by altering the position of the digits, the edges of the wafer are compressed, and the concretion is either converted into pulp or breaks into innumerable fragments which can be passed on towards the duodenum or subsequently washed through.

In the thirty-one cases here reported in which this operation was done there has been no subsequent trouble on account of damage to the ducts.

In some cases of stones in the common duct, the concretions will be found too hard to crush, and it may be necessary to perform choledochotomy.

The disadvantages of cholelithotripsy are, first, the fear of seriously damaging the ducts by the manipulation, and, secondly the danger of leaving fragments permanently in the passages, which may then grow by further deposit of cholesteroline.

The cases referred to show that the first danger need not be feared, if the finger and thumb only be used as the compressing force; but it might be real if attempts were made to crush hard stones by instrumental means, although padded forceps were employed to some of the earlier cases, as suggested by Tait.

Increased experience has led us to prefer the more exact operation of choledochotomy to that of cholelithotripsy, as in the latter there is always the uncertainty of having left fragments too large to pass the opening into the duodenum, whereas when the duct is incised it can be cleared with almost absolute certainty.

The danger from leaving fragments in the ducts may be overcome by at the same time performing cholecystotomy and later syringing the ducts with sterilized water until they

are clear of débris, or, if any fragments should be unavoidably left, by applying through the fistula some solvent solution.

In Case 23, after cholecystotomy, with crushing of calculi in the common duct, the fragments did not pass until a few drops of a solution of turpentine in ether were injected into the fistula; great pain followed, the duct became patent, the fistula closed, and the patient has remained well since. The result in this case was probably rather due to the contractions set up in the duct than to the solvent action of the remedy used; and we cannot, on account of the severe pain set up for some hours, recommend its employment, though in this case the result was good. A more efficient method which we now employ whenever there is reason to think that any of the fragments remain in the duct, as shown by the discharge of bile continuing through the cholecystotomy opening beyond the normal two or three weeks, or wherever a gall-stone has been left which could not be crushed and which it was not thought wise to remove by choledochotomy, is to syringe a warm '5 per cent. solution of *sapo animalis* or warm olive-oil through the fistula night and morning until the passages are quite free.

The olive-oil and soap solution probably act in a double capacity as solvents and as lubricants.

Dr. Brockbank found that a gall-stone placed in a '5 per cent. solution of *sapo animalis* in distilled water, and kept at the body heat in an incubator, lost 34 per cent. of its original weight in three weeks, and that a similar concretion in a '1 per cent. solution lost 14 per cent. of its weight in the same time.

The question of *needling impacted concretions* by the passage of a needle through the walls of the duct, was raised again by Mr. Pridgin Teale in 1895. The subject is referred to in 'Gall-stones and their Treatment,' published in 1892, and this method has been employed by Mr. Knowsley Thornton; it was also fully discussed after a paper given before one of the societies, and it was almost unanimously decided that, although concretions might be broken up by needling, the operation was inadvisable, on account of the almost unavoidable damage to the ducts and the fear of infection.

It may, however, be borne in mind that some of the very hard stones can be broken up by means of a needle, and that the fragments can be further crushed between the finger and thumb.

Choledochotomy, or choledocholithotomy, is the name given to the operation of incising the bile-ducts for the extraction of gall-stones in cases where the concretions cannot otherwise be removed.

It was first suggested by Langenbach in 1884, though Kummell (quoted by Fenger) stated in 1890 that he, several years before, had performed cholecystectomy on a female patient of forty, after which he had removed a stone the size of a walnut from the common duct through an incision which he afterwards sutured. The operation was a very prolonged one, and the woman died twenty-four hours afterwards.

Courvoisier performed the first successful operation on January 22, 1890, and two others, both successful, in February and March of the same year.

Since that time it has been done by many surgeons; and at the present time it may be confidently asserted that there is no portion of the gall-bladder, common, cystic, or primary divisions of the hepatic duct, which cannot under ordinary circumstances be reached for the removal of calculi, as the appended list of cases will show.

Operation.—The cholecystotomy incision must be extended to 4 or 5 inches, and after the separation of adhesions the wound must be held open by a retractor on the right, and preferably by an assistant's finger on the left, as the fingers can at the same time retract the pylorus and stomach on the left, and the colon and omentum below, without inflicting injury, as retractors are apt to do. An oblique incision through the parietes along the lower border of the right lobe of the liver gives more room than the vertical incision where the common duct has to be explored; but by lengthening the vertical incision and having the edges well retracted ample room is obtained. The assistant who is using the retractor on the right may with advantage use his left hand to draw upwards the overhanging liver and costal margin.

A sand-bag placed under the lower dorsal spine makes the region of the common duct more accessible by bringing it several inches nearer the surface.

The operator should now, after having separated adhesions, have a good view of the common duct within the free border of the lesser omentum, and on inserting his left index-finger into the foramen of Winslow, or on grasping the duct between the index-finger and thumb, he can without difficulty bring the duct well within reach, the concretion making a distinct projection.

Over the prominent stone, a vertical incision, as low down and as far forward as possible, should be made, sufficiently large to allow the concretion to pass. Through this opening a probe can be passed, or even a finger, in order to explore the ducts thoroughly, so as to remove other stones if present.

To leave a small concretion may invalidate the operation, since, as Courvoisier, and later Fenger, have shown, a small gall-stone may by its ball-valve action occasion repeated attacks of pain and jaundice.

It is of the utmost importance to clear the ducts, or operation will be futile, as shown by Kehr, who left concretions behind in 16.6 per cent. of his cases, and by Riedel, Terrier, Fenger, Lauenstein, Küster and others. Fenger has suggested a flexible metallic probe, which, he says, will give a click when it touches a stone, or which will produce a grating sensation when it passes one. This we know by experience to be a fallacious guide, as after carefully probing, and even passing a scoop into both hepatic ducts and up and down the common duct without feeling a calculus, a finger inserted through the incision felt a stone, which was then removed; but had we trusted to a probe the calculus would have been left. The duct is usually dilated sufficiently to permit digital exploration, which under such circumstances we should always advise, reserving a bent probe, or, better still, a slender bent scoop, for use where the duct is not capacious enough for the finger. The hepatic duct and its primary branches can be readily explored, and in Case 217 calculi were removed from them through an incision in the common duct.

The incision in the duct may now be closed by interrupted sutures in two layers, first the muscular and fibrous coats being approximated, and secondly the serous margins; but if this be impracticable, the muscular and serous coats may be sutured together, and additional Lembert's sutures may be applied over all.

A rectangular cleft-palate needle is a most convenient instrument to employ in applying these deep sutures, though



FIG. 47.—DIAGRAM TO ILLUSTRATE THE FIRST SUTURES IN CHOLEDOCHOTOMY.

doubtless a small circular intestinal needle and holder will answer equally well, or the special needles and holder suggested by Mr. Lane may be found more convenient.

If a gall-stone be found in the hepatic duct, it may be reached by opening the common duct, and passing a scoop or forceps through this opening.

Dr. Elliott recommends the application of the sutures before removing the stone.

This is certainly an advantage, though, if the ducts have to be explored afterwards, the sutures are rather in the way. The same advantages may be obtained by introducing the two end stitches before extracting the calculus, as when they are drawn on, the edges are approximated and more easily sutured (Fig. 47).

Professor Halstead advocates* the use of a small hammer which he has devised for facilitating the application of sutures in the repair of the common bile-duct. By expanding the duct, and drawing it towards the surface, it not only temporarily blocks the passage, but allows the sutures to be accurately applied.

A large drainage-tube with a gauze drain in it should be left in the abdomen and brought out through a lumbar stab wound, and it may be wise to gently pack iodoform gauze over the duct, and to bring the end out by the side of the drainage-tube, if there be any doubt about the closure of the wound in the duct.

The tube may be removed in twenty-four or forty-eight hours if there be only a little discharge, and the gauze should be gradually removed day by day until it is all away.

Mr. Knowsley Thornton has thought it advisable in some of these cases to insert a glass drain through a small opening above the pubes, but this plan has not been generally followed by others.

Drainage through a stab wound in the right loin is an efficient means of draining the discharge from a leaking gall-bladder or bile-duct, since there is a distinct peritoneal pouch here, bounded above by the right lobe of the liver, below by the ascending layer of the transverse meso-colon covering the duodenum internally, externally by the parietal peritoneum, and internally by the peritoneum covering the right side of the vertebral column and passing up to the foramen of Winslow (Fig. 48).

Morison† has found this pouch to be capable of holding nearly a pint before it overflows into the general peritoneal cavity. He advocates drainage of this pouch and non-suture

* *Johns Hopkins Hosp. Bulletin*, 1898.

† *British Medical Journal*, November 3, 1894.

of the ducts, if there be any difficulty in securing the margins of the opening.

Mr. Frederick Page,* on the other hand, advocates careful suture of the opening in the duct, and closing the abdomen without leaving in a drainage-tube. He gives four cases in support of his views.

The late Mr. Greig Smith said that drainage is always advisable, and in this view we fully agree, as although in several cases there has been little or no discharge from the drainage-tube, in others the bile-stained discharge for a few days has proved that the closure of the opening was not

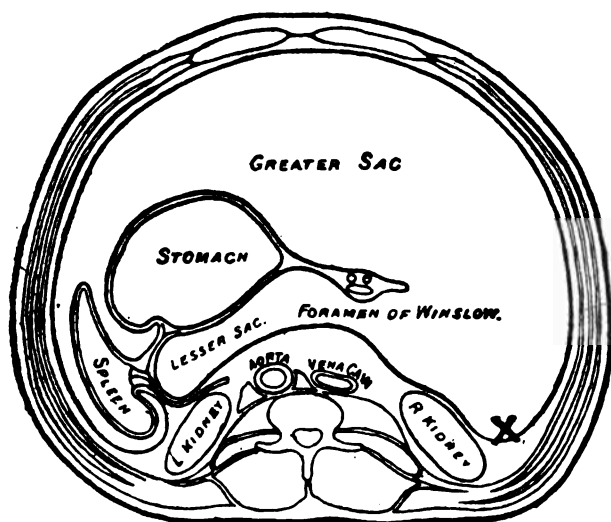


FIG. 48.—TRANSVERSE SECTION THROUGH CENTRE OF POUCH DESCRIBED.

perfect; and it must be borne in mind that, although the ducts appear to be clear, it is impossible to be absolutely certain, as was proved in Case 141, where under the supposition that the common duct had been effectually cleared a shrivelled and mutilated gall-bladder was removed and the cystic duct ligatured, with the result that septic bile became extravasated into the peritoneal cavity. A small gall-stone was found obstructing the orifice of the duct where it was opening into the duodenum. The same difficulty was experienced in one of Fenger's cases and in several of Kehr's.

* *Lancet*, December 5, 1896.

Statistics of Choledochotomy.—As this is, perhaps, the most difficult and prolonged of the operations on the bile-ducts, the mortality is necessarily greater than that of simple cholecystotomy. In 1892 Martig had collected 27 cases, and in 1895 Mermann 17 others, giving a total of 44 cases, with a mortality of 18 per cent. Terrier,* in 1892, had collected 20 cases, with a mortality of 25 per cent. Hans Kehrl† collected from various sources 84 cases of choledochotomy, with 31 deaths=37·8 per cent. Even excluding severe cases, the mortality was 25 per cent., though in his own practice the death-rate was only 6·6 per cent. In a later series‡ his mortality was 12·5 per cent.

He remarks: 'The operation involves many difficulties, which can only be overcome by one performing a large number of operations, and even then it is not very easy to remove all the concretions.

Out of 30 cases, in 5 all the stones were not removed; in 3 the operation was repeated; and in 2 cases the wound re-opened and gave exit to the calculi that had been left.

Fenger has reported 7 cases, of which 1 died=14·3 per cent.

Murphy of Chicago, 5 cases, of which 2 died=40 per cent. Of the 21 cases tabulated below, 5 died=23·8 per cent.

* *British Medical Journal* Supplement, January 7, 1893.

† *Berlin Klin. Woch.*, June, 1896.

‡ *Langenbeck's Archives*, vol. lviii., part 3.

CASES OF CHOLEDOCHOTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
35	5-2-91	H. M. C. 42 F.	Choledochotomy & cholecystotomy	Cyst of liver due to dilated hepatic duct. Incision of duct in liver, about 8 oz. of fluid evacuated, and drainage adopted; free bleeding controlled by gauze packing; 3 gall-stones removed; jaundice	R.	Relief; small discharge of bile persisted for a time	Dr. Lee, Dewsbury
59	28-1-93	A. M. 38 M.	Choledochotomy	Large gall-stone removed from common duct through incision, which was afterwards sutured; drainage; jaundice	D.	Fæcal extravasation through small perforation in colon, caused by separating adhesions, and unrecognised at time of operation. Death in 2nd week	Infirmary
125	26-10-95	S. W. 52 M.	Cholecystotomy & choledochotomy	Slight jaundice. Gall-bladder ruptured suddenly during separation of adhesions; 1 stone removed, $\frac{3}{4}$ in. in diameter, through incision in common duct; drainage through loin	R.	Cured. September, 1897, passed 2 gall-stones per anum. Well in interval	Infirmary
145	25-6-96	E. F. 44 F.	Cholecystotomy & choledochotomy	Numerous gall-stones removed from gall-bladder; common duct blocked by large stone which was removed by incising the duct; gall-bladder distended and much thickened; drainage; deep jaundice	"	Cured	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
150	18-7-96	J. C. 25 M.	Cholecystostomy	Large gall-stone, size of small hen's egg, in cystic and common duct, crushed; cystic duct dilated and longer than gall-bladder; drainage of duct; jaundice	R.	Recovery	Infirmary
158	8-12-96	A. W. 50 F.	Cholecystotomy & choledochotomy	Spasms; jaundice; loss of weight. Common duct incised; 2 stones removed; duct sutured, and gall-bladder drained	"	Cured	Infirmary
171	15-3-97	L. G. 38 F.	Choledochotomy	Spasms for 15 years; lately attacks very frequent, and followed by rigors and increased jaundice; no tumour. Operation: 14 stones removed from gall-bladder and from common duct	"	Quite well, July, 1898	Dr. Friend, Leeds
177	21-5-97	M. G. 62 F.	Choledochotomy	For 20 years attacks of spasms, but no jaundice until 4 weeks before operation, since which time jaundice continuous, with ague-like attacks and rapid loss of flesh; patient very feeble. Operation: Gall-stone, size of cherry, removed from common duct through incision, which was afterwards sutured; drainage of peritoneal pouch	D.	Recovered from operation, but never gained strength, and death occurred at end of 5 weeks from exhaustion	Dr. Kershaw, Pudsey

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
187	28-7-97	A. A. 42 F.	Cholecystectomy	Gall-stones; first attack of pain 6 years ago; frequent attacks since, increasing in severity, with rigors, vomiting, and jaundice; urine dark-coloured, and faeces very light; no tumour. Operation: 1 large and several small stones removed from gall-bladder and common duct	R.	Good recovery	Infirmary
188	5-8-97	M. R. 51 F.	Cholecystectomy	Subject to attacks of pain over liver for years up to 3 years ago, since which time to Christmas, 1897, had been free from pain; from Christmas numerous attacks, usually followed by jaundice and ague-like seizures; great loss of flesh; pre-systolic cardiac bruit. Operation: Large gall-stone removed through incision in common duct, which was then closed by sutures	"	Good recovery. Quite well when heard of some months later	Dr. Jones, Hucknall Torkard, Notts

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
194	7-10-97	H. B. 30 F.	Cholechochotomy	Gall-stones; attacks of paroxysmal pain in gall-bladder region for 5 years; the first attack was accompanied by rigors, vomiting, and nausea, and followed by jaundice, and lasted 6 days, the jaundice persisting 6 weeks; since January 1, 1893, patient has always been jaundiced, unwell, and unable to work, and has had amenorrhea extending over long periods; lately metrorrhagia; no tumour. Operation: 1 stone, weighing 1 drachm, removed from common duct; offensive pus aspirated from gall-bladder	R.	Satisfactory recovery	Dr. G. Greenwood, Ossett
215	7-4-98	M.S.S. 47 F.	Cholechochotomy	Patient first admitted in February, when she refused operation. The history was that 18 months previous to admission she had a severe attack of abdominal pain in right hypochondriacal region, which radiated to back and left shoulder-blade. The attacks have recurred frequently since, and have increased in severity and duration; membranous casts noticed in motions; tumour the size of an egg on palpation. Operation: 78 stones removed from gall-bladder, cystic duct, and common duct; numerous adhesions detached	"	Left the infirmary well within the month with wound healed; subsequently a fistula formed	Dr. Saunders, Wales

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
217	16-5-98	M. J. 49 F.	Choledochotomy	7 years ago frequent attacks of 'spasms' for a year, after which no recurrence for 6 years; January, 1898, recurrence of pain, followed by jaundice and ague-like seizures; stomach dilated and liver enlarged. Operation: Adhesions of gall-bladder to pylorus separated; gall-bladder drained, common duct incised, and several gall-stones removed; finger inserted into duct, and other stones felt in hepatic duct and removed by small scoop	R.	Complete recovery and regained health	Dr. Irving, Huddersfield
220	7-7-98	M. D. 46 M.	Choledochotomy	Attacks of epigastric pain 2 years, with vomiting, but without jaundice; loss of a stone in weight; tumour present for at least 6 weeks; slight jaundice. Operation: Gall-stones removed from gall-bladder by cholecystotomy; 1, impacted deeply in cystic, near common duct, removed by incising duct, which was afterwards sutured	"	Good recovery. Now quite well	Dr. Smith, Doncaster

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
223	21-7-98	P. W. 34 F.	Cholecystotomy	<p>4 years' history of attacks of pain, commencing in epigastrium, and radiating to mid-scapular region; each attack lasted several hours, was accompanied by a rigor and vomiting, and followed by jaundice; during the last 8 months attacks more severe and more frequent, the jaundice persisting; the patient was deeply jaundiced; no distension of gall-bladder; tenderness on deep pressure below right costal margin.</p> <p>Operation: Extensive adhesions between gall-bladder, stomach, duodenum, and omentum separated; gall-bladder contracted; common duct blocked with stones; stones extracted with scoop through incision in common duct; duct closed by double row of sutures; gauze drainage; recovery delayed by an attack of bronchitis, to which patient was subject; jaundice had almost completely disappeared when she left the hospital</p>	R.	Very well, September 18	Dr. Craik, Conisborough

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
236	19-10-98	M. M. 55 F.	Choledochotomy	<p>6 years ago influenza; 4 months after, severe pain over liver and on left side of abdomen; pain off and on 6 weeks, when jaundice appeared; since then frequent ague-like attacks with jaundice and fever; great loss of flesh; œdema of legs; pulse 108, feeble; severe mitral disease and dilated heart, with albuminuria; liver large; swelling in site of gall-bladder hard; no nodules felt in liver. Patient seen a month before, thought too ill for operation, and general treatment advised; but, as she was manifestly going to die if not relieved, operation was reluctantly decided on to give her a last chance, especially as under digitalis the heart seemed to have improved sufficiently to warrant it. Operation: Many adhesions; common bile-duct incised and several gall-stones removed; finger passed up into cystic and hepatic ducts, which were occupied by gall-stones that were then removed by the scoop; duct sutured; drainage of abdomen</p>	D.	Death from exhaustion and heart failure on 6th day	Dr. Gordon Black, Harrogate

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
256	16-3-99	M. B. F.	Choledochotomy	Gall-stone colic 20 years ago; no recurrence till January, 1898, since which frequent attacks; jaundice persisted for 6 months, but varying in intensity with seizures; for weeks elevation of temperature (101°, 102°, and 103°); in evening, chilly feeling, but no rigors; great loss of flesh. Operation: Gall-bladder contracted on a faceted gall-stone, size of a bean; floating gall-stone in much-dilated common duct removed by incision in duct; gall-bladder drained; gauze drain into right kidney pouch; gauze drain removed at end of 36 hours	R.	Good recovery. Well, June, 1899	Dr. Blanc and Dr. McDougall, Cannes, France
257	23-3-99	E. G. 47 F.	Choledochotomy	Repeated gall-stone seizures for 2 years; no jaundice; no shivers; distended gall-bladder, which is tender; no fever. Operation: Em-pyema of gall-bladder; many small stones in gall-bladder; 1 large stone removed from cystic duct by choledochotomy; drainage of gall-bladder and gauze drain down to incision in duct	"	Cured	Dr. Lambert, Farsley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
259	6-5-99	M. A. 48 F.	Cholechochotomy	<p>• Innumerable' attacks of gall-stone colic, usually followed by jaundice, sometimes lasting a month, but lately more transient; attacks recently milder, but more frequent, and latterly there have been rigors with the seizures; attack of localized peritonitis 12 months ago; slight tinge of jaundice; physical examination negative. Operation: Numerous adhesions broken down; numerous stones removed from gall-bladder and cystic duct; 3 removed from common duct through two incisions, as one of the stones was encysted and required separate incision; drainage of gall-bladder and right kidney pouch; both wounds in common duct stitched up</p>	R.	<p>Very considerable discharge from kidney pouch for a week, otherwise good recovery; no peritonitis</p>	Dr. Bramwell, Cheltenham
272	6-7-99	S. G. 46 M.	Cholechochotomy	<p>Symptoms of gall-stone colic, recurring almost weekly, for nearly 11 months; each attack followed by rigors and deepening of jaundice, which latterly has been persistent; great loss of flesh. Examination: Liver moderately enlarged; deep jaundice; irregular temperature, with rigors; no enlargement of gall-bladder to be felt. Operation: Single stone removed from gall-bladder, 2 stones from common duct, through incision into the duct; many adhesions broken down; drainage</p>	D.	<p>Persistent vomiting, and death from exhaustion 4th day</p>	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
277	6-9-99	M. K. 49 F.	Choledochotomy	<p>Gall-stone attack, followed by jaundice, 12 years ago; freedom from severe seizures for 10 years, but 'spasms' and painful digestion; several attacks since; marked loss of flesh; dilatation of stomach well marked; hard swelling felt beneath ribs; slight icterus; albuminuria.</p> <p>Operation: Numerous adhesions separated; gall-bladder contracted; common duct as large as small intestine; duct incised, and 2 gall-stones, size of small Brazil-nuts, removed; duct sutured; lumbar drainage</p>	D.	Violent hæmatemesis 12 hours after operation, and death from exhaustion within 30 hours	Dr. Fisher, Skipton

Duodeno-choledochotomy is a term applied to the modification of the operation of choledochotomy, in which gall-stones are removed from the common duct through an incision in the duodenum.

Duodeno-choledochotomy was first performed by Dr. McBurney (*Annals of Surgery*, October 18, 1893), next by Professor Kocher (*Korresp. f. Sch. Herzte*, 1895, No. 7), and we believe that Case 182 was the first performed in this country (*British Medical Journal*, November 5, 1898).

Dr. McBurney has performed the operation on six occasions, with one death, due to prolonged vomiting in a patient who had always suffered from an irritable stomach. These with Professor Kocher's case, and one reported by Dr. Sinclair White, make eight cases with one death, or a mortality of 12.5 per cent. Out of the seven cases reported below, two died, showing a mortality of 28.57 per cent.

The operation is really less difficult than it would appear, and is much facilitated by placing a sand-bag under the lower dorsal spines. The termination of the common duct, including the duodenum, should be grasped between the finger and thumb of the left hand and the anterior wall of the gut cut through, thus exposing the interior of the posterior wall of the intestine with the termination of the common duct running in it. Either the duct can be laid open from the papilla, or the stone may be cut down on, through the posterior wall of the duodenum. Bile flows freely as soon as the obstruction is removed, and it must be mopped away as it flows, since it always contains pyogenic microbes, and is therefore infective. As a rule, there will be no trouble with bleeding, and no sutures need be placed in the posterior wall of the duodenum. The incision through which the duodenum has been opened, should be sutured by a continuous catgut suture for the mucous membrane, and a continuous silk suture for the peritoneum. No drainage is required.

For calculi situated in the lower third of the common duct, especially if impacted in the diverticulum of Vater, the operation is decidedly preferable to the ordinary choledochotomy, as not only is it easier, but an incision of the narrow orifice of the bile-duct in the duodenum leaves a patent opening,

which will allow any other concretions that may have escaped observation to pass without difficulty.

This method of reaching the common duct will, in all probability, be practised much more frequently than hitherto, now that its safety and practicability have been established.

It is available not only for gall-stone obstruction, but also for jaundice depending on cancer of the opening of the common bile-duct (see p. 147) and for obstruction of the orifice of the pancreatic duct.

CASES OF DUODENO-CHOLEDOCHOTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
182	17-6-97	M.A.B. 39 F.	Duodeno - choledo- chotomy	First attack in February, with jaundice, clay - coloured motions, and dark-coloured urine, also vomiting and constipation; confined to bed 5 weeks. Second attack 1 month ago, similar to first; no tumour to be felt. Operation: Gall - bladder found much atrophied; no stones, in either gall-bladder or ducts, but 2 small hard stones felt and removed from ampulla of Vater through incision in duodenum, which was then sutured; no drainage	R.	Complete recovery. Well when seen 6 months after	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
209	3-3-98	E. H. 57 F.	Duodeno - choledo- chotomy	Gall-stones. First attack 12 months ago, lasting several hours, followed by jaundice; it commenced with a rigor; the urine was very dark-coloured and motions pale; the attacks have recurred since at very short intervals; she has lost considerably in weight; infective cholangitis. Operation: Very extensive adhesions were met with and broken down; gall-bladder not to be found; large stone found in papilla of common duct, and removed through incision in duodenum; duodenum sutured; no drainage	R.	Satisfactory recovery. Report later to say patient quite well	Dr. Parke, Tidswell, Buxton
218	17-5-98	J. G. 39 M.	Duodeno - choledo- chotomy	Gall-stones. First attack 6½ years ago; pain more or less continuous since, and occasionally severe paroxysmal attacks, lasting 12 to 13 hours; the attacks were accompanied by vomiting and rigors, and followed by jaundice and high-coloured urine; he has lost 2 stones in weight since the attacks first began; no tumour to be made out. Operation: Gall-bladder atrophied and could not be found; large gall-stone found impacted in third part of common duct; duodenum incised, stone size of filbert extracted; duodenum sutured; no drainage	"	Letter, dated July 24, to say patient was well and had returned to his work as goods guard on railway	Dr. Peach Hay, Peterborough

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
226	10-8-98	S. P. 44 F.	Duodeno-chole- doch-enterostomy	<p>First attack of pain 5 years ago; another 3 years ago; free from pain up to 8 months ago; since then attacks every few weeks; pain very severe, radiating from right hypochondrium to right subscapular region, accompanied by vomiting, and always followed by jaundice; no rigors; tender swelling detected below right costal margin. Operation: Gall-bladder found adherent to omentum, transverse colon, and pylorus; adhesions separated; gall-bladder very much thickened and infiltrated; 116 stones removed from it and cystic duct by scoop; common duct still blocked with stones; condition of patient and extensive adhesions around duct rendered choledochotomy inadvisable; dilated cystic duct united to duodenum by Murphy's button; incision in gall-bladder closed, and aperture stitched to muscles; no drainage</p>	R.	Satisfactory recovery. Well when last heard of	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
243	1-12-98	E. L. 49 F.	Duodeno - choledochotomy	Spasms' 5 years; jaundice first, 3½ years ago; sickness and jaundice without pain off and on since; jaundice continuous for 5 weeks; ague-like attacks 2 months ago, and five or six since. Examination negative; no tenderness; no tumour; great loss of flesh. Operation: Gall-stone in ampulla of Vater removed through duodenum; no drainage; wound re-opened 7th day, but nothing abnormal found	D.	Death 14th day. Autopsy: Duodenal wound soundly healed; collection of pus between liver and diaphragm not discovered at time of operation, or on re-opening wound	Dr. Lee. Dewsbury
255	9-3-99	A. G. 27 F.	Duodeno - choledochotomy	First attack 15 months ago, with jaundice; never free from jaundice since, but increasing with each seizure, latterly very marked, recently slight epistaxis; no rigors; deep jaundice; tumour in right hypochondrium like distended gall-bladder; liver dullness increased. Operation: Riedel's lobe and distended gall-bladder; stone impacted at ampulla of Vater removed through duodenum; another stone higher up, removed by scoop; duodenal wound closed; gauze drain down to incision	"	Well until evening of 15th, with normal pulse and temperature; sudden rise of pulse and vomiting continued till 17th, when patient died. Post-mortem: No peritonitis; superficial wound, and wound in duodenum healed; stomach much dilated; omental adhesion binding first part of duodenum to pyloric end of stomach. Death apparently due to heart failure from pressure of dilated stomach; nothing else found to account for fatal result	Dr. Thompson. Mytholmroyd

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
269	15-6-99	M. B. 47 F.	Duodeno - choledochotomy	<p>'Spasms' 10 years; no jaundice till June, 1898, when jaundiced for a week; has been jaundiced off and on since Christmas, and without intermission for 2 months; frequent ague-like attacks and high fever; great loss of flesh; slight bleeding from the nose; liver enlarged and probably some enlargement of spleen; no tumour; tenderness just above umbilicus. Operation: Many old-standing adhesions of stomach, pylorus and colon to gall-bladder and liver separated; 4 floating gall-stones removed from common duct by incision through duodenum; little hæmorrhage; calcium chloride has been given; drainage of right kidney pouch through counter-opening at side</p>	R.	Regained health. December, 1899, ill with cancer of liver	Dr. Bates, Ilkley

Cholecystectomy, or excision of the gall-bladder, may be required—

1. In bullet-wound or other wound of the gall-bladder, where suture is impracticable.
2. In phlegmonous cholecystitis.
3. In gangrene of the gall-bladder.
4. In multiple, or in perforating ulcers.
5. In chronic cholecystitis from gall-stones, where the gall-bladder is shrunk and too small to safely drain, and where the common duct is free from obstruction.
6. In mucous fistula due to stricture of the cystic duct.
7. In hydrops of the gall-bladder due to stricture of the cystic duct; as also in certain cases where the gall-bladder is very much dilated.
8. In certain cases of empyema, where the walls of the gall-bladder are very seriously damaged.
9. In cancer of the gall-bladder.

It is contra-indicated in all cases of non-patency of the common duct, and it should not be resorted to under the idea that it will prevent the formation of gall-stones, as calculi may form in the bile-ducts, within the liver or below it.

The operation is performed through the usual incision for reaching the gall-bladder.

The peritoneum covering the gall-bladder just below the liver is incised parallel to the hepatic margin, and the gall-bladder is freed by means of a finger or a blunt dissector as far back as the cystic duct, the latter part of the dissection being done subperitoneally as much as possible.

The duct is ligatured and divided, the stump being aseptitized either by the cautery or by the application of a 1 in 500 solution of perchloride of mercury. The peritoneum is now sutured over the top of the duct. There is usually little bleeding, and that is easily arrested by sponge pressure or by one or two ligatures.

Unless there be oozing, or unless the wound has been infected by pus or gall-bladder secretion, drainage may perhaps be thought unnecessary; but the adage, 'When in doubt drain,' is a good one, and it can do no harm to leave an efficient drainage-tube in the right kidney pouch for twenty-

four or forty-eight hours after extirpation of the gall-bladder. Packing with iodoform gauze in these cases is better than using a tube, as it serves the double purpose of arresting oozing from the lacerated liver and acting as a drain.

Statistics.—Martig has collected* 87 cases of cholecystectomy, with 12 direct and 3 indirect deaths, thus giving a mortality of 17·24 per cent. ; Kehr, 21 cases with 1 death = 5 per cent. Murphy gives the mortality up to 1893 as being 17 per cent.

Delagenière collected 38 cases of cholecystectomy, with 9 deaths, thus giving a mortality of 23 per cent.

Courvoisier collected 47 cases, of which 10 died directly as the result of operation, and 2 indirectly from the operation, giving a mortality of 25·5 per cent.

We have performed the operation 12 times, with 2 deaths, giving a mortality of 16·6 per cent.

* *Centralbl. für Chir.*, April 14, 1894.

CASES OF CHOLECYSTECTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
22	14-5-90	S. G. 51 F.	Cholecystectomy	Mucous fistula; stricture of cystic duct, following gall-stones	R.	Complete and permanent cure. Well, 1893	Dr. Horne, Barnsley
55	6-8-92	H. M. 38 M.	Cholecystectomy & choledochenterostomy	Biliary fistula; dilated cystic duct united to colon by small decalcified bone bobbin	"	Perfectly well for some months, after which jaundice recurred. See Case 59	Infirmary
65	28-4-93	G. T. 44 F.	Cholecystectomy	Mucous fistula over gall-bladder	"	Perfect recovery. Well, 1894	Infirmary
111	2-5-95	M. 46 M.	Cholecystectomy	Gall-bladder cavity contracted; walls hypertrophied and adherent; frequent seizures of intense pain like cholelithiasis, which had doubtless been the cause of the cholecystitis and cholangitis	"	Recovered, and 9 months later in perfect health	Dr. Keyes, New York, and Dr. Gilchrist, Nice

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
121	24-7-95	H. P. 55 F.	Cholecystectomy & choledochenteros- tomy	Operation undertaken for closing a mucous fistula, when the gall- bladder was found to be forming a tumour with walls $\frac{1}{2}$ to $\frac{3}{4}$ in. thick. Cholecystectomy was performed, and the open end of the cystic duct connected to the small bowel by means of a Murphy's button	R.	Completely cured, and in good health, 1896	Infirmary
127	23-11-95	W. F.	Cholecystectomy & hepatectomy	2 gall-stones removed from gall- bladder; gall-bladder distended and dilated; with thick material like putty; walls infiltrated with malig- nant disease; cancer in cystic duct; gall-bladder excised with $\frac{1}{2}$ lb. of liver	"	Patient improved, and remained well till Feb- ruary 27, 1896, when she returned with superficial nodule in abdominal wall, which was excised. She died some months afterwards from recur- rence of disease. Case reported Clin. Soc., 1896	Dr. O'Connell, Keighley
141	2-4-96	E. C. 47 F.	Cholecystectomy	18 stones removed; adhesions very firm and gall-bladder shrunken; cystic duct ligatured and gall- bladder removed; patient jaundiced	D.	Ligature slipped from duct on 2nd day, and bile became extravasated, producing toxemia and peritonitis. I was un- fortunately absent at the time, or I should have reopened the abdomen. Stone found in divertic- ulum of Vater	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
201	27-11-97	M. H. 52 F.	Cholecystectomy & hepatectomy	Pain over gall-bladder for a year; tumour noticed a month. Operation: Cancer of gall-bladder and adjoining part of liver, with gall-stones in gall-bladder and cystic duct; all affected parts removed by means of an elastic ligature	R.	Good recovery. Patient out of doors in 6 weeks. Recurrence of disease, April, 1898	Dr. Ruxton, Blackpool
208	17-2-98	J. B. 52 F.	Cholecystectomy & hepatectomy	Attacks of pain in right hypochondriac region commenced in September, 1897, but became especially severe in December; a large tumour present. Operation: Gall-bladder and cystic duct filled with stones; walls of gall-bladder infiltrated with growth, which extended into liver, pylorus, and colon; adhesions detached, and gall-bladder and adjoining part of liver removed by elastic tourniquet	D.	Death from shock	Dr. Carter, Richmond

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
234	29-9-98	A. W. 40 F.	Cholecystectomy & hepatectomy	<p>Strong family history of phthisis; in 12 months several attacks of severe pain in right iliac region, accompanied by swelling in normal situation of cæcum, and marked tenderness between anterior superior spine of ilium and umbilicus; each attack associated with fever, constipation, vomiting, and abdominal swelling, and all signs of local peritonitis over inflamed appendix. Operation: Incision over cæcum; viscera matted together by old and recent lymph. After separating adhesions, gall-bladder reached at end of projecting Riedel's lobe; muco-pus and several gall-stones removed; tumour of cystic duct felt, and as on incision it gave appearance of growth, it, with the gall-bladder and projecting lobe of liver, was removed by means of elastic ligature. Mr. Targett reported the tumour to be inflammatory, and not due to tubercle or cancer</p>	R.	Satisfactory recovery. Quite well some months later. In good health January, 1900	Dr. Nicholson Dobie, Keighley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
256	9-3-99	W. S. 56 M.	Cholecystectomy	Cholecystotomy for contracted gall-bladder and adhesions, September 4, 1898, followed by relief for some time, but rigors recurred. Operation: Removal of gall-bladder containing muco-pus; cystic duct apparently strictured; no bile flowed at time of operation, but drainage-tube inserted down to cystic duct; free flow of bile following day. See Case 229	R.	Good recovery. Now well	Dr. Anderson, Nottingham

Cholecystenterostomy consists in establishing an artificial opening between the gall-bladder and intestine, duodenum, jejunum or colon, preferably the first, when it may be termed cholecyst-duodenostomy.

Although the conception of the operation occurred independently to Harley, Gaston, and Nussbaum, the first operation was actually performed by Winiwarter, of Liège, in 1880, and my own case, in 1889, was the first operation performed in England and was the first cholecystenterostomy for biliary fistula.

In its place it is an extremely useful operation, but, as it leaves the cause of the obstruction unremedied, it ought not to be resorted to except occasionally, where a more radical operation is impracticable or inadvisable.

Dr. Murphy, of Chicago, favours the procedure before other methods, and gives the following as the indications for its performance :

1. In all cases where it is desirable to drain the gall-bladder for accumulations therein.

2. In all cases of occlusion of the ductus choledochus.

3. In all cases of cholelithiasis where obstruction of the duct is present, or where the reflex disturbances of digestion are marked.

4. In all cases of cholecystitis, either with or without gall-stones.

5. In all chronic discharging biliary fistulæ, either following operations or as sequelæ of pathological changes.

6. In all cases of perforation of the common duct when it is necessary to obliterate the duct in the reparative process.

Murphy's Contra-indications. — 1. In all cases in which the gall-bladder is too small for the insertion of the button.

2. When the adhesions are so extensive that the bowel cannot be brought in contact with the gall-bladder without kinking.

3. In obliteration of the ductus cysticus, with enormously enlarged non-adherent gall-bladder.

In these cases cholecystectomy should be performed.

Our own conclusions are that the operation is indicated—

1. In biliary fistulæ depending on stricture or other permanent occlusion of the common duct.

2. Very occasionally in cancer of the head of the pancreas, or malignant tumour of the common duct leading to chronic jaundice and distended gall-bladder; but in such cases the mortality will necessarily be so high that the justifiability of the operation is questionable.

3. Occasionally in impaction of gall-stones in the ducts, where the patient is not in a fit condition to bear the more prolonged operation of separating adhesions, and crushing or removing the concretion by choledochotomy.

4. In certain cases of obstruction of the cystic duct where cholecystectomy is impracticable.

5. In chronic pancreatitis.

Contra-indications.—1. In any obstruction of the bile-ducts which can be cleared away with reasonable probability of success.

2. In malignant disease of the head of the pancreas or common bile-duct leading to distension of the gall-bladder the mortality is so great that it is hardly worth incurring the risk, unless the patient be in very good condition.

3. In contracted gall-bladder where it is impracticable to insert the button.

4. Where there are extensive adhesions preventing easy access.

5. In very large gall-bladder with obstruction of the cystic duct, where cholecystectomy should be done.

The operation may be performed—

(a) By means of simple suture.

(b) By means of the decalcified bone bobbin.

(c) By means of Murphy's button.

My first case, in 1889, was performed by suture, my second and third by means of the decalcified bone bobbins, and in all my later cases the Murphy button has been used. Although in the cases unassociated with cancer all except one recovered, it is decidedly preferable to make the union by means of the Murphy button, both on account of its efficiency and the expedition with which it can be used.

The operation of cholecystenterostomy is performed through the same incision as is made for cholecystotomy, and after the gall-bladder has been aspirated and the intestine clamped, if thought necessary, either by an india-rubber tourniquet or by intestinal clamps, the junction is effected. If sutures be employed, a semicircle of interrupted silk stitches is inserted to unite the contiguous serous surfaces of the gall-bladder and gut; the viscera are then opened, and the mucous margins of the two openings are

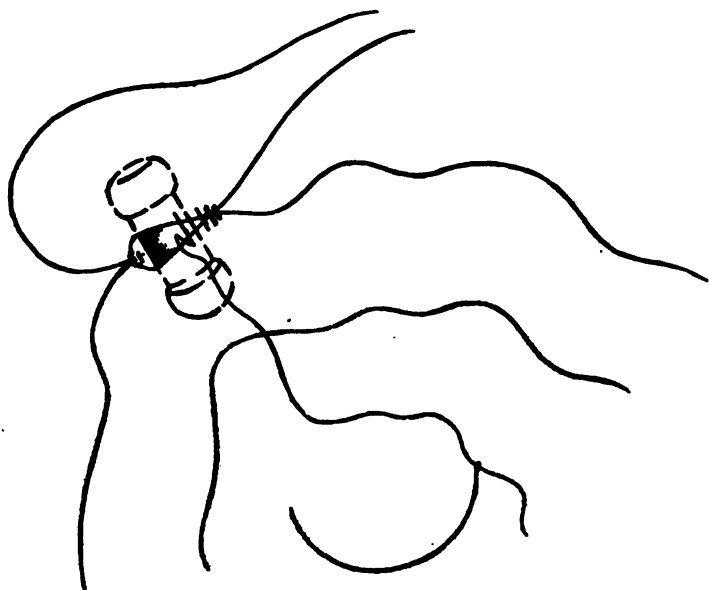


FIG. 49.—DIAGRAM TO SHOW APPLICATION OF MUCOUS OR MARGINAL SUTURE IN THE BONE BOBBIN OPERATION.

united by interrupted catgut stitches, after which the circle of catgut stitches and then the circle of serous sutures is completed.

If the bone bobbin be used, two continuous sutures only are employed: a silk stitch to unite the serous surface $\frac{1}{8}$ or $\frac{1}{4}$ inch from the visceral openings, and a catgut suture to join the mucous margins of the visceral openings.

For convenience, the posterior semicircle of the serous suture is first applied, and the needle laid aside for a moment,

but not unthreaded; the openings are then made, and the posterior half of the mucous suture is inserted. The bobbin is then introduced, and the mucous suture continued around until it meets the other end of the catgut, when the two ends are tied and cut off short; the serous suture is then carried around the anterior half until it reaches the point where it began, when the two ends are drawn on and tied. (Figs. 49 and 50.) The bobbin keeps open the lumen until

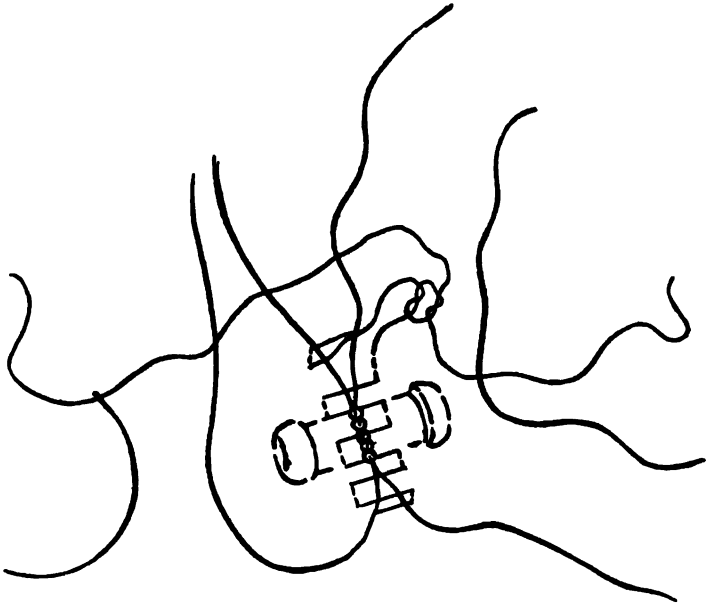


FIG. 50.—DIAGRAM TO SHOW APPLICATION OF SEROUS SUTURE IN THE BONE BOBBIN OPERATION.

it is dissolved, and the mucous and serous sutures effectually protect the channel from leakage.

If the Murphy button be used, the smallest size is selected, and two running sutures are applied, as shown in the diagram. After the gall-bladder has been emptied, and the bowel clamped either by Murphy's intestinal clamps or Lane's clamps, or by a simple elastic tourniquet, the openings are made in the viscera just sufficiently large to admit the separate ends of the button. The threads are then drawn on and tied around the central barrel of the button (Figs. 51

and 52), after which the two ends of the button are approximated and pushed home firmly. The anastomosis is then complete.

The whole process occupies a very short time, and is really very simple. It is, however, necessary to bear in mind that the button has to separate, by causing the approximated



FIG. 51.—FIRST STAGE OF THE BUTTON OPERATION.

margins of the openings to slough, and that the true bond of union is only slight at first, so that it is well to keep the patient absolutely quiet for at least a fortnight, lest the new bond of union should give way and permit of extravasation of the visceral contents.

In considering the question of cholecystenterostomy, it has to be borne in mind that the operation can only be done

when the gall-bladder is of moderate size or dilated, and that it is inapplicable to the difficult class of cases where a gall-stone is impacted in the common duct and the gall-bladder is atrophied.

When it can be done, the anastomosis should be made to the duodenum ; but, if preferred, a free loop of jejunum may be selected and brought over the hepatic flexure of the colon.

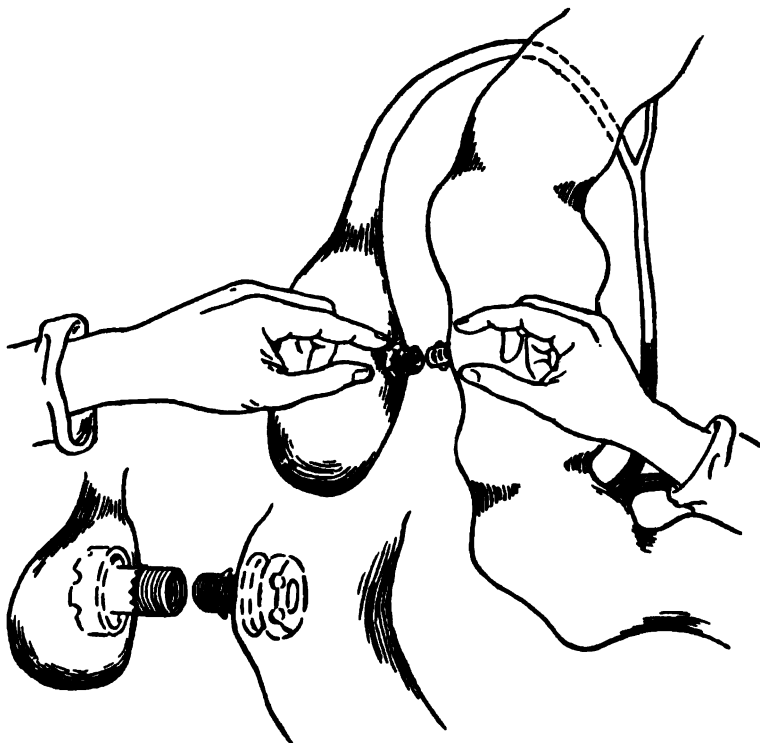


FIG. 52.—LAST STAGES OF THE BUTTON OPERATION.

Only in exceptional cases should the anastomosis be made between the gall-bladder and colon.

The statistics according to Murphy, given in the Transactions of the International Congress at Rome, are :

23 cases by suture, with 8 deaths = 34 per cent.

21 cases for gall-stone by button, no deaths.

2 cases for malignant disease, with 2 deaths = 100 per cent.

From a report up to 1897, which Dr. Murphy was so kind as to furnish, cholecyst-duodenostomy had been performed with the aid of the anastomosis button in 67 non-malignant cases, with only 3 deaths, these being due to continuous hæmorrhage from laceration of the liver substance on the seventh day, to cholæmia on the fourth day, and to septicæmia on the fourth day, respectively. Of his 12 malignant cases 10 died, giving a mortality of 83·3 per cent.

My own cases are 17 in number, with 3 deaths. Of these 12 were done for gall-stones alone or fistula, and all recovered, 4 for malignant disease with 2 deaths, and 1 for suppurative cholangitis, in which case the patient died.

CASES OF CHOLECYSTENTEROSTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
13	2-3-89	V. B. 44 F.	Cholecystenter- ostomy	Gall-bladder united to colon by sutures for biliary fistula	R.	Quite well, 1898	Infirmary
73	31-7-93	L. P. 40 F.	Cholecystenter- ostomy by decal- cified bone bobbin	Biliary fistula	"	Quite well, 1894	Infirmary
118	15-7-95	C. 51 F.	Cholecystenter- ostomy (Murphy's button)	Persistent jaundice. Several gall- stones removed or crushed; tumour of pancreas thought to be felt; but the sequel makes it probable that the tumour was inflammatory	"	Recovered, but Murphy's button never found. Well, 1898	Dr. Smith, Doncaster
123	27-8-95	J.W.B. 56 M.	Cholecystenter- ostomy	Dilated gall-bladder; no calculi; stenosis of common duct; pain and jaundice for a year. Gall-bladder distended, containing 3 oz. of fluid tinged with bile	"	Recovered. Murphy's button passed in 2 weeks. Report 1897: gained weight after operation, and has been at work ever since. Oc- casional attacks of pain and jaundice	Dr. Lee, Dewabury
146	27-5-96	S. W. 37 F.	Cholecystenter- ostomy	This case was operated on during pregnancy, December 17, 1895, and second operation performed for pain and jaundice, May, 1896; 7 large stones removed, and gall-bladder fixed to intestine by Murphy's button	"	Button never found. Left hospital well	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
147	13-7-96	D. T. 37 M.	Cholecystenter- ostomy	Biliary fistula following operation at St. Bartholomew's Hospital; persistent jaundice; no stones found; tumour probable. Cholecystenterostomy by Murphy's button	R.	Bile all passing into bowel, and wound healed	Dr. Sykes, Barnsley
149	17-7-96	H. S. 49 M.	Cholecystenter- ostomy	Cancer of pancreas and common duct; distended gall-bladder; jaundice continuous for 4 months; no gall-stones	D.	Intra - parietal and intra-peritoneal hæmorrhage; no peritonitis. Very exhausted at time of operation, but lived a week after	Infirmary
156	1-11-96	E. O. 52 M.	Cholecystenter- ostomy	'Spasms' 10 months; jaundice; cholangitis; liver found nodular. Murphy's button used; large stone in common duct too hard to crush, and patient too ill to bear prolonged operation	R.	Complete recovery, and jaundice had disappeared before he left the infirmary	Infirmary
168	25-2-97	A. B. 34 M.	Cholecystenter- ostomy	Painful attacks resembling cholelithiasis since June, 1896; deep and continuous jaundice since December; distended gall - bladder; no gall-stones could be felt; numerous adhesions. Gall-bladder connected to duodenum by a Murphy's button; calcium chloride administered before operation	"	Doing well	Dr. Dowsing, Hull

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
173	6-4-97	M. W. 50 F.	Cholecystenter- ostomy	Spasms for years, but for 6 months ague-like attacks and jaundice associated with the painful seizure; no tumour. Operation: Adhesions so firm that common duct could not be cleared, though gall-stones could be felt in it; small gall-bladder con- nected to duodenum by Murphy's button	R.	In robust health, July 19, 1898	Dr. H. Robson, Leeds
178	25-5-97	M. S. 65 M.	Cholecystenter- ostomy	Indefinite history of past pains; in- fluenza, followed by deep jaundice, 12 weeks before; pain did not pre- cede jaundice; rapid loss of flesh and repeated rigors, with tempera- ture 104° and 105°; uniform enlarge- ment of liver; petechiæ in skin, and epistaxis. Diagnosis: Suppurative cholangitis. Operation: Cholecyst- enterostomy by Murphy's button; thickening of common duct (char- acter?) felt, together with gall-stones in common duct	D.	Death from exhaustion and shock 3rd day	Dr. Thompson, Skipton

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
195	18-10-97	M. R. 49 F.	Cholecystenter- ostomy	Patient had 2 gall-stones removed from gall-bladder in Canada 3 years ago, but ducts could not be cleared on account of collapsed condition; never free from jaundice since operation; frequent vomiting; dilatation of stomach; tenderness over gall-bladder and pylorus. Operation: Adhesions of gall-bladder, bowel, and pylorus very firm, but freely detached; thickening along bile-ducts, evidently obstructing flow of bile; gall-bladder united to duodenum by metal button	R.	Slow, but satisfactory recovery. Health gradually regained	Dr. Kilner Clarke, Huddersfield
204	7-1-98	M. S. 27 F.	Cholecystenter- ostomy	Recurrence of pain exactly resembling gall-stone attacks, but without jaundice; confined about a month ago, but attacks no better since delivery; and larger doses of morphia required to give relief. Operation: Adhesions detached, and gall-bladder and ducts explored; no gall-stones found, but thickened ropy mucus in gall-bladder; gall-bladder connected to duodenum by metal button	"	Good recovery, and returned home within a month. Button passed on 10th day. Some pain a few weeks after return. Quite well at beginning of 1899	Dr. Patterson, Dalton-in-Furness

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
242	1-12-98	G. J. 61 M.	Cholecystenter- ostomy	Jaundice for 8 weeks with little pain; no history of gall-stones; feeling of discomfort over gall-bladder, which was distended; loss of weight very considerable. Operation: Cancer of head of pancreas; cholecystenterostomy with aid of Murphy's button	R.	Good recovery. Button passed 16th day	Infirmary
255	10-3-99	M. W. 65 M.	Cholecystenter- ostomy	For a year repeated attacks of gall-stone colic, now recurring every 8 days; lately followed by jaundice, varying in severity, but never absent; attacks latterly associated with rigors; no gastric disturbance; no tenderness; liver depressed somewhat; no tumour; heart-sounds weak; arteries atheromatous; albuminuria; emaciated. Operation: Large stone in common duct, but patient too weak to bear prolonged operation. Murphy's button passed 10th day	"	Patient very weak from 3rd to 7th day, with some delirium, after which good recovery from operation. Relieved for 3 months, but then some recurrence of symptoms	Dr. Paton, Bridge Sowerby, Bridge

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
264	16-5-97	M. L. 59 M.	Cholecystenter- ostomy	Failure of health for a year, but otherwise well till 6 months ago: since then attacks of pain, beginning in lower abdomen and extending to back and upper abdomen, never to shoulders; no fever; no rigors; jaundice persisted for 2 months; vomiting, no large quantity and no blood; loss of weight; pain every 12 hours, requiring morphia; spare man, deeply jaundiced; pulse weak, but regular; nodular swelling, hard, and slightly tender, in region of gall-bladder and towards middle line; distended gall-bladder. Operation: Cancer of pancreas; gall-bladder distended; cholecystenterostomy by Murphy's button	D.	Cardiac failure, 4th day; no peritonitis	Dr. Holloway and Dr. Bruce, Birmingham
271	26-6-99	A. B. 46 M.	Cholecystenter- ostomy	Gall-stone attacks for 7 years; symptoms of floating stone in common duct, 1897; infective cholangitis, 1899; loss of 4 stones in weight. Operation: Tumour of liver found and excised; number of small stones in common duct crushed; cholecystenterostomy by Murphy's button	R.	Good recovery. Gained a stone in weight by September. Quite well January, 1900	Dr. Fisher, Skipton

Choledochostomy is the term applied to the direct surface drainage of a dilated bile-duct. Terrier has described four cases (*Revue de Chirurgie*, February, 1893). Dr. Arnison of Newcastle had a fifth under his care, and a specimen from a sixth will be found in Guy's Museum, all ending fatally within a few days or weeks of operation, owing to associated choledochitis and infection of the bile-channels in the liver itself.

In July, 1896, choledochostomy was performed in a man of twenty-five, after crushing and removing a gall-stone the size of a small hen's egg, situated at the junction of the cystic and common ducts; the gall-bladder being much smaller than the duct, it was found easier to fix and drain the latter. The patient made a good recovery (Case 150). Yversen has since had a case, but we are unaware of the result. We have since the above had another successful case of drainage of the common duct (Case 303, Appendix).

Choledochenterostomy.—Where it is impossible to clear the ducts, instead of performing choledochostomy, the operation of choledochenterostomy may be done, the union of the dilated duct to the duodenum being made by means of a Murphy's button. Three cases are reported below, and the operation has also been done successfully by Dr. Sprengel and Kiedel, and by Dr. Swaine.

As a rule, the shrunken and diseased gall-bladder can be removed, and the end of the dilated cystic duct fixed to the bowel by a Murphy's button (as in Case 121) or by a bone bobbin (as in Case 50). It will not usually be necessary to employ drainage. In the third case (No. 250) laceration of the liver occurred in separating adhesions, and although the laceration was sutured, hæmorrhage occurred into the peritoneum, with extravasation of septic bile, though no laceration of the ducts could be found, and the new artificial opening appeared to be perfectly sound.

CASES OF CHOLEDOCHENTEROSTOMY.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
50	6-8-92	A. M. 38 M.	Cholecystectomy and choledochen- terostomy	Biliary fistula. Dilated cystic duct united to colon by small decalcified bone bobbin	R.	Perfectly well for some months, after which jaundice recurred. See Case 59	Infirmary
121	24-7-95	H. P. 55 F.	Cholecystectomy and choledochen- terostomy	Operation undertaken for closing a mucous fistula, when the gall-bladder was found to be forming a tumour with walls $\frac{3}{4}$ to $\frac{1}{2}$ in. thick. It was removed, and the open end of the cystic duct connected to the small bowel by means of a Murphy's button	"	Completely cured, and in good health, 1896	Infirmary
250	19-1-99	M. S. 48 F.	Choledochenter- ostomy and chole- cystectomy	Cholecystectomy, April, 1898. Wound healed, and patient made a good recovery; but some time after, a fistula developed, and continued to discharge muco-pus and bile, closing from time to time, only, however, to require opening up. As each attack was accompanied by fever and considerable distress, and as a swelling could be felt beneath the right costal margin, operation was advised. Operation: Peritoneal cavity opened; numerous adhesions found; all landmarks obliterated; gall-bladder and ducts examined, but no evidence of blockage; chain of hardened glands felt along course of common duct; gall-bladder contracted, and as it was lacerated in detaching adhesions, it was removed, and the cystic duct connected by means of a Murphy's button with the duodenum. The liver was slightly lacerated in separating adhesions	D.	Imperfect drainage and extravasation of infected bile from torn surface of liver was responsible for the fatality, which occurred on 5th day. The artificial union between the bile-duct and gut was perfect	Dr. Saunders, Wales

APPENDIX.

LIST OF CASES OPERATED ON BETWEEN JULY, 1899, AND JANUARY, 1900.

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
279	15-7-99	M. J. 37 F.	Cholecystotomy	Cholelithiasis for 10 years; till June last only one attack for 5 years; since then numerous seizures with jaundice; marked loss of flesh; tenderness over gall-bladder; distinct swelling. Operation: Distended gall-bladder; single stone removed from cystic duct	R.	Good recovery. Now well	Dr. Haswell, Penrith
280	22-8-99	C. 31 M.	Cholecystotomy	September 12, 1898: Ill since February; influenza followed by scarlet fever. In March biliary colic with jaundice; no attacks before, but several since, last a week ago; now slight icterus and tenderness, and slight fulness over gall-bladder. August 17, 1899: In January and February last 6 weeks jaundiced, and advised by Von Bruns to have operation; now attacks of colic every 2 or 3 days, preceded by jaundice; dyspepsia marked; lost 2 stones 3 lb. in weight in 16 months; rigid right rectus; tenderness below 9th costal cartilage; no jaundice; dilatation of stomach. Operation: Contracted gall-bladder; extensive adhesions; no stones, but inspissated mucus; drainage 3 weeks	"	Well, January, 1900. Re-gained lost weight	Dr. Turner, York

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
281	24-8-99	A. M. 37 F.	Cholecystotomy	Well till 6 weeks ago, when she had severe attack of pain in right hypochondrium followed by jaundice; since then pain constant; occasional rigors with elevation of temperature; jaundice persistent; loss of flesh. Operation: 2 large and 1 small calculi removed from gall-bladder; drainage	R.	Uninterrupted recovery	Dr. Murphy, Leeds
282	24-8-99	S. 51 F.	Cholecystotomy	Never 'spasms' or indigestion till a year ago, when marked gall-stone colic without jaundice; second attack in October, and since then one each month; jaundiced twice, and in April fever with seizure; pain always to right shoulder-blade; gastric disturbance, even after ingestion of fluids; lost 3 stones in weight within year; tenderness over gall-bladder; no tumour. Operation: Very thick, contracted gall-bladder; inspissated mucus; very extensive adhesions of colon and stomach to gall-bladder, cystic duct and liver; many small stones; drainage for a fortnight	"	Good recovery	Dr. Tate, Mansfield

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
283	6-9-99	K. 52 F.	Choledochotomy	12 years ago acute cholecystitis; no gall-stones ever found in motions; no further severe attack for 10 years, but all along 'spasms,' without jaundice, and painful indigestion; marked loss of flesh; during last 2 years several attacks followed by jaundice; latterly infective cholangitis. Operation: Separation of adhesions; drainage of gall-bladder; removal of several floating stones from common duct	D.	Violent and persistent hæmatemesis came on at end of 1st day, and persisted till death, on 2nd day. Patient very well during first day; vomiting after anæsthetic contained bile but no blood	Dr. Fisher, Skipton
284	21-9-99	J. F.	Cholecystotomy	Gall-stone symptoms for years; seen 1 year ago and operation urged; rigors and deepening of jaundice during year before operation, with great loss of flesh; dilatation of stomach. Operation: 2 oz. of pus in gall-bladder, which was firmly adherent to colon and stomach; 1 large stone removed from gall-bladder, and two larger from cystic duct; at site of impaction of lowest stone thickening of duct, probably inflammatory; stomach much dilated; pylorus kinked	R.	Uninterrupted recovery	Dr. Wright, Leeds, and Dr. Starling, Tunbridge Wells

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
285	14-10-99	R. 45 F.	Cholecystotomy	Cholelithic attacks for 24 years; at first no jaundice, but latterly after each attack; recent attacks more severe; some loss of flesh. Examination: Dilatation of stomach; tenderness 1 inch to right of and above umbilicus; no enlargement of liver or gall-bladder. Operation: 28 stones removed from gall-bladder; cystic duct found strictured; adhesions separated; drainage 12 days	R.	Good recovery, but slight attack of pain 1 month after operation, probably from passage of inspissated mucus. January 28, 1900: No further trouble; feels very well	Dr. Greig
286	23-10-99	H. 51 F.	Cholecystenterostomy	Attacks of cholelithiasis for 3 years; during past 14 weeks attacks frequent and severe, and jaundice practically continuous; loss of flesh; no rigors; no tumour noticed; no enlargement of gall-bladder or liver; tenderness in epigastrium; slight jaundice; albuminuria slight; no cedema of feet. 15 gall-stones removed from gall-bladder; large mass, nodular and hard, at head of pancreas; Murphy's button used to join gall-bladder to duodenum	"	Very good recovery. Immediate improvement. Tumour (? interstitial pancreatitis). Within 2 months had gained 10 lb. in weight	Dr. Squance, Sunderland

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
287	30-10-99	W. 48 F.	Cholecystectomy	For over 10 years 'spasms' at intervals of 1 to 3 months; latterly they occur every week; now constant pain; continuous jaundice for 6 weeks, 'bad colour' for a year; no rigors; lost 2 stones 4 lb. since June. Examination: Enlargement of right lobe of liver and probably of gall-bladder; tenderness over gall-bladder and common duct; jaundice and albuminuria. Operation: Cancer of gall-bladder and cystic duct; nodules on under surface of liver. Cholecystectomy, after separation from liver, and ligature of cystic duct	R.	January, 1900: Report to say patient feeling well, and improving every day	Dr. Wilson, Paddock
289	9-11-99	J. F. 45 M.	Cholecystenterostomy	Attack of severe epigastric pain in September, 1898, lasting 5 hours, and followed by rigor and jaundice; icterus present since; since then repeated attacks of pain, with irregular temperature and rigors. In September, 1898, weight 15 stones; now 9 stones 6 lb.; motions light-coloured and offensive; normal amount of fat in faeces; gall-bladder distended and tender; liver enlarged. Operation: Gall-bladder contained mucopus; gall-stone felt in common duct; hard, nodular tumour of head of pancreas, probably malignant. Cholecystenterostomy by means of Murphy's button; drainage in loin	"	Recovery uneventful, and the jaundice almost disappeared. Button found in 3rd week. In January, 1900, some return of jaundice, and steady failure of strength	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
290	18-11-99	R. 42 F.	Cholecystotomy	'Spasms' 15 years; much worse lately; for last 3 years accompanied by jaundice; latterly jaundice persistent; rigor with last attack; no ascites; no oedema of legs; gall-bladder not enlarged; no nodules on liver; very feeble; pulse 120. Operation: Adhesion of gall-bladder to liver, stomach, colon and omentum; tumour of head of pancreas, nodular in character; large stone at junction of cystic and common duct removed through gall-bladder; many small calculi; at end of operation pulse 100; 10 minims liq. strychninæ given before operation	R.	Uninterrupted recovery. Jaundice disappeared	Dr. Rayner, Stockport
291	24-11-99	S. 46 F.	Cholecystotomy	23 years ago had 'spasms'; then free till 3 years ago; since then frequent gall-stone colic at intervals of 1 to 3 weeks; never deeply jaundiced, but considerable loss of weight; no tumour; tinge of jaundice; tenderness over gall-bladder. Operation: Cholecystotomy, with removal of 80 gall-stones and separation of numerous adhesions	"	January, 1900: Patient said to be very well	Dr. Woodcock, Beeston Hill

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
292	30-11-99	L. 62 F.	Cholecystotomy	Movable tumour in abdomen noticed 5 years ago; spasms 20 years ago, not lately; constipation for years; no loss of flesh; no vomiting; movable smooth tumour to right side and below umbilicus, free of kidney, which is normal, but continuous with a Kiedel's lobe. Operation: Single large stone in gall-bladder removed	R.	Good recovery	Dr. Spink, Otley
293	4-12-99	P. 70 F.	Cholecystotomy	Seen for what was supposed to be incarcerated hernia becoming strangulated; fall downstairs 18 months ago, since which symptoms marked, and it was thought that some fibres of the rectus had been ruptured; history of 'spasms' with jaundice years ago; hard tender lump 1 inch above umbilicus, said to have been partly reducible with a gurgie till 24 hours before. Operation: On opening sac muco-pus with gall-stones found; opening enlarged, and large calculus removed from gall-bladder; drainage	"	Complete recovery. Report January 2, 1900, to say patient quite well	Dr. Shann, York

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
294	7-12-99	J. D. 49 M.	Separation of adhesions	Cholecystitis after influenza 2 years ago; during past year indigestion and loss of weight; 1 year ago weighed 14 stones, now 12 stones; no albumin, no sugar; rigid, right rectus simulating tumour; dilatation of stomach. Operation: Intimate adhesion between the pylorus and stomach and the liver and gall-bladder; no gall-stones; adhesions separated	R.	January 12, 1900: Gained 10 lb. in weight. January 22: Gained 4 lb. more	Dr. McGregor Young, Leeds
295	11-12-99	D. 46 F.	Cholecystotomy	'Spasms' for years; acute seizure in July, and three times since; since July pain and sickness every two weeks; no tumour felt at any time; occasionally after an attack slight jaundice; lost 1 stone in weight; never vomited blood; no melæna. Examination: Tenderness over gall-bladder; no tumour; slight enlargement of head of pancreas. Operation: Empyema of gall-bladder; many small stones removed from gall-bladder and cystic duct; adhesions broken down; nodular condition of head of pancreas	"	Good recovery	Dr. Berry, Keighley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
296	21-12-99	M. J. F. 35 F.	Cholecystotomy	Cholelithic colic for 16 years; at first three or four times a year; for last 3 years constant discomfort with severe colic every 5 weeks; no jaundice; lying on right side easier than on left; tenderness below right costal margin at 9th costal cartilage; rigidity of right rectus; no tumour. Operation: Gall-bladder acutely inflamed, and containing pus; 2 large stones removed from cystic duct	R.	Complete recovery	Dr. Marsden, Burnley
297	21-12-99	R. M. 44 F.	Cholecystotomy	Cholelithiasis 4 years, with repeated typical attacks requiring morphia to subdue pain; three attacks within last fortnight; no jaundice; no tumour, but tenderness over gall-bladder area. Operation: Gall-bladder high up under liver; large stone in cystic duct manipulated back into gall-bladder and removed along with 50 small stones	"	Complete recovery	Dr. Veale, Drighlington

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
298	10-1-1900	M. A. M.	Partial cholecystec- tomy and chole- cystostomy	No history of gall-stone colic till begin- ning of December, 1899, when severe attacks without jaundice; two minor attacks since; severe seizure a week ago, with rigor and elevated tempera- ture, which has persisted since; no jaundice; very great tenderness over gall-bladder and whole of right hypo- chondrium; rigid right rectus, and questionable distended gall-bladder. Operation: No gall-stones, but very marked local peritonitis; distal half of gall-bladder, which was quite gangrenous, excised; remnant of cyst drained	R.	Uninterrupted recovery	Dr. Tempest An- derson, York
299	10-1-1900	M. M. 62 F.	Cholecystotomy	Subject to epigastric and right hypo- chondriac pain for 2 years; worse since influenza in 1898; attacks of pain at times very severe, but never followed by jaundice; flatulent dis- tension and indigestion, with vomit- ing at times, and inability to take solid food for six months before operation; tumour beneath right costal margin noticed for 4 months, and tenderness between umbilicus and 6th costal cartilage; stomach splash obtained; bedridden for 3 months before operation; great loss of flesh. Operation: Adherent py- lorus freed; 2 large stones removed from cystic duct, and numerous small calculi from gall-bladder	"	Complete recovery; able to take any kind of food, and now putting on flesh	Dr. Humphery, Armley

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
300	13-1-1900	M. T. 32 F.	Cholecystotomy	<p>Attacks of epigastric pain for 4 years, occurring at first every 3 months, but later more frequently; vomiting and shivering with each attack, but never definite jaundice; painful seizures have no relation to taking food or to exertion; tenderness over gall-bladder; no tumour; no jaundice; stomach dilated moderately. Operation: 1 gall-stone, size of cherry, and 424 small stones removed from gall-bladder and cystic duct; pylorus, which was closely adherent to gall-bladder and duct, freed</p>	R.	Good recovery	Dr. Moffatt, Keighley
301	13-1-1900	A. S. 35 F.	Cholecystotomy	<p>Severe attacks of cholelithic colic, and many slight attacks during the last 5 years, each attack followed by more or less distinct jaundice; 11 years ago slight attacks of spasms with jaundice; slight tenderness on deep palpation over gall-bladder; slight jaundice; no other physical signs. Operation: 229 small stones removed from gall-bladder and cystic duct, which was dilated</p>	"	Good recovery	Infirmary

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
302	18-1-1900	E. S. 54 F.	Cholecystotomy	For 12 months repeated slight attacks of spasms; during last 3 months attacks much more severe; 3 weeks ago, after an attack, patient passed 4 small gall-stones per rectum; following this there was some melæna; distended gall-bladder, which is tender; no jaundice. Operation: 2 large gall-stones removed from gall-bladder, one $\frac{1}{2}$ in. in diameter, and another $\frac{3}{4}$ in. in diameter	R.		Infirmary
303	28-1-1900	M. G. 50 M.	Cholecholestomy	No history of spasms; first attack of gall-stone colic October, 1897, followed by jaundice; severe seizure in December, 1897, with jaundice lasting 2 months, and associated with ague-like seizures; slight attacks for a year, and then one very severe in December, 1898, and again in January, 1899; during whole period icterus, deepening after each attack, and occasionally rigors; lost 'over 24 stones' in weight; patient jaundiced, but not deeply; liver not enlarged; no tumour of gall-bladder; tenderness above and to right of umbilicus; well-marked dilatation of stomach. Operation: Fistula between shrunken gall-bladder and colon; cystic duct shrunken; common duct dilated to size of small intestine, and containing large floating gall-stone; calculus crushed, and fragments manipulated back through cystic duct; tube introduced into common duct through cystic duct; fistulous opening in colon closed	..	Uninterrupted recovery	Dr. Windle, Ovenden

No.	Date.	Initials, Age, Sex.	Operation.	Description.	Re- sult.	After-History.	With whom seen.
304	6-2-1900	M. W. 38 F.	Cholecystotomy & separation of ad- hesions	For 12 years hepatic colic, but pain rather irregular, passing to groin as well as to shoulder; latterly attacks of pain every 2 or 3 months; never jaundiced; dyspepsia; no physical signs. Operation: inspissated bile-stained mucus in gall-bladder; intimate adhesions of stomach to liver and gall-bladder; drainage of cyst and separation of adhesions	R.	Doing well	Dr. Wallis, Harnsley
305	7-2-1900	M. P. 30 F.	Cholecystotomy	Gall-stone attacks for 12 years; recently more frequent and severe, so that she has been off work for several months; dyspepsia and some loss of flesh; no rigors; no jaundice; no tumour. Operation: Thick mucus, but no gall-stones; pylorus adherent to cystic duct, and kinking of first part of duodenum; adhesions separated; gall-bladder drained	"	Doing well, March 3, 1900; already gained 2 lb. in weight	Dr. Rodgers, Burnley

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THE END.



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